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Europe and Central Eurasia

Volume III

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U.S. Department of the Interior
U.S. Geological Survey

MINERALS YEARBOOK

Area Reports: International 2009

Europe and Central Eurasia

Volume III

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U.S. DEPARTMENT OF THE INTERIOR
KEN SALAZAR, Secretary

U.S. GEOLOGICAL SURVEY
Marcia K. McNutt, Director

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Foreword

This edition of the U.S. Geological Survey (USGS) Minerals Yearbook discusses the performance of the worldwide minerals and materials industries during 2009 and provides background information to assist in interpreting that performance. Content of the individual Minerals Yearbook volumes follows:

- Volume I, Metals and Minerals, contains chapters about virtually all metallic and industrial mineral commodities important to the U.S. economy. Chapters on survey methods, summary statistics for domestic nonfuel minerals, and trends in mining and quarrying in the metals and industrial mineral industries in the United States are also included.
- Volume II, Area Reports: Domestic, contains a chapter on the mineral industry of each of the 50 States and Puerto Rico and the Administered Islands. This volume also has chapters on survey methods and summary statistics of domestic nonfuel minerals.
- Volume III, Area Reports: International, is published as four separate reports. These regional reports contain the latest available minerals data on more than 190 foreign countries and discuss the importance of minerals to the economies of these nations and the United States. Each report begins with an overview of the region's mineral industries during the year. It continues with individual country chapters that examine the mining, refining, processing, and use of minerals in each country of the region and how each country's mineral industry relates to U.S. industry. Most chapters include production tables and industry structure tables, information about Government policies and programs that affect the country's mineral industry, and an outlook section.

The USGS continually strives to improve the value of its publications to users. Constructive comments and suggestions by readers of the Minerals Yearbook are welcomed.

Marcia K. McNutt, Director

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Contacts

Information about the U.S. Geological Survey, its programs, staff, and products may be accessed on the Internet at http://www.usgs.gov or by contacting the Earth Science Information Center at 1-888-ASK-USGS. For specific information about this publication, contact the Chief, Global Minerals Analysis Section, National Minerals Information Center (NMIC), at (703) 648-7732, or the NMIC secretary at (703) 648-4961. Additional minerals information may be accessed on the Internet at http://minerals.usgs.gov/minerals.

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Acknowledgments

The Country Specialists in the National Minerals Information Center, U.S. Geological Survey, in preparing the International Review regional books of volume III of the Minerals Yearbook, extensively use statistics and data on mineral production, consumption, and trade provided by various foreign Government minerals and statistical agencies through various official publications. The cooperation and assistance of these organizations are gratefully acknowledged. Statistical and informational material was also obtained from reports of the U.S. Department of State, United Nations publications, and the domestic and foreign technical and trade press. Of particular assistance were reports submitted by the Resource Reporting Officers and other officers of the Department of State in U.S. Embassies worldwide. Their contributions are sincerely appreciated. Internal statistical support was provided by the staff of the Data Collection and Coordination Section of the National Minerals Information Center.

The regimes of some countries reviewed in this volume may not be recognized by the U.S. Government. The information contained herein is technical and statistical in nature and is not to be construed as conflicting with or being contradictory of U.S. foreign policy.

John H. DeYoung, Jr.
Director, National Minerals Information Center

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The Mineral Industries of Europe and Central Eurasia

By Steven T. Anderson, Mark Brininstool, Alfredo C. Gurmendi, Richard M. Levine, Harold R. Newman, Alberto Alexander Perez, Glenn J. Wallace, and David R. Wilburn

As a subset of the Eurasian landmass, the region of Europe and Central Eurasia encompasses continental territory that extends from the Atlantic coast of Europe to the Pacific coast of Russia and includes Iceland, Ireland, and the United Kingdom. Greenland in the northwest Atlantic Ocean and Sakhalin and Kurile Islands in the Pacific Ocean are also covered in this volume. The region hosts a number of political and economic organizations that have a role in the mineral economies of the member countries. In 2009, the European Union (EU) consisted of 27 countries (Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and the United Kingdom). The euro area (also referred to as the eurozone) comprised the 16 member states of the EU that had adopted the euro (€) as their currency (Austria, Belgium, Cyprus, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, Netherlands, Portugal, Slovakia, Slovenia, and Spain) and in which a single monetary policy is conducted under the responsibility of the European Central Bank. In 2009, Iceland, Liechtenstein, Norway, and Switzerland were members of the European Free Trade Association (EFTA). Iceland applied for EU membership in July, and negotiations were expected to start in 2010. Liechtenstein is not listed separately in the tables for this chapter (tables 1-4; European Central Bank, 2010, p. 262; European Free Trade Area, 2010, p. 3, 13; International Monetary Fund, 2010, p. 149).

In 2009, the Commonwealth of Independent States (CIS) included 11 countries (Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan). The 47-member Council of Europe included 7 of the 8 remaining central and eastern European countries listed in the tables for this chapter (Albania, Bosnia and Herzegovina, Croatia, Georgia, Macedonia, Montenegro, and Serbia), and only Kosovo was not yet a member of any of the major supranational bodies in the region. In addition to Kosovo, six other countries that we consider in this regional chapter (Belarus, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan) were also not members of the Council of Europe. All of the members of the EFTA and the EU were also members of the Council of Europe (tables 1-4; International Monetary Fund, 2010, p. 58, 149-151, 156-159; Council of Europe, 2011).

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- Albania—Institute of Statistics (INSTAT);
- Armenia—National Statistical Service;
- Austria—Bundesministerium für Wirtschaft, Familie und Jugend;
- Azerbaijan—State Statistical Committee of the Azerbaijan Republic;
- Belarus—Ministry of Statistics and Analysis of the Republic of Belarus;
- Belgium—Statistics Belgium (StatBel);
- Croatia—Statistical Information and Documentation Division;
- Czech Republic—Czech Geological Survey, Ministry of Industry and Trade;
- Denmark—Danmark og Gronlands Geologisk Undersogelse;
- Estonia—Geological Survey of Estonia;
- Finland—Statistics Finland;
- France—Bureau de Recherches Géologiques et Minières (BRGM);
- Germany—Bundesanstalt für Geowissenschaften und Rohstoffe;
- Hungary—Magyar Köztársaság Gazdasági Ès Közlekedési Minisztérium Magyar Geológiai Szogálat (Hungarian Geological Survey);
- Iceland—Statistics Iceland;
- Ireland—Geological Survey of Ireland;
- Italy—Istituto Nazionale di Statistica (ISTAT);
- Kazakhstan—Agency on Statistics;
- Kyrgyzstan—Ministry of Foreign Affairs;
- Lithuania—Statistics Lithuania;
- Luxembourg—Central Statistical Service;
- Netherlands—Staatstoezicht op de Mijnen [State Supervision of Mines];
- Poland—Central Statistical Office;
- Portugal—Instituto Geológico Mineiro-Division de Statistical Studies;
- Romania—National Institute of Statistics;
- Slovakia—Statistical Office;
- Slovenia—Slovenian Government;
- Ukraine—State Statistics Committee; and
- United Kingdom—British Geological Survey.

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General Economic Conditions

From March through December 2008, the global economic downturn contributed to a decrease in the prices of many metals, industrial minerals, mineral fuels, and other commodities worldwide, including decreases in the price of nickel (–69%), lead (–68%), copper (–63%), crude petroleum (–61%), zinc (–56%), aluminum (–50%), and tin (–43%), although the prices of these same mineral commodities subsequently increased by 89%, 85%, 126%, 78%, 72%, 50%, and 83%, respectively, from January 2009 through August 2010. Perhaps more importantly for the mineral industries of many countries in Europe and Central Eurasia, the downturn had a negative effect on growth in demand for end-use products that require minerals intensively as inputs in the production process (for example, many products produced by the construction, chemicals, engineering, and machinery and equipment sectors). For those countries, and especially those of western Europe, the decrease in commodity prices (even if temporary) helped lower costs and keep some of the lower-cost mineral processing capacity and industrial production of end-use goods from being closed down in 2009. On the other hand, global demand for many raw minerals appeared to grow substantially in 2009 (especially during the second half of the year), and the prices of some mineral commodities appeared to increase, which benefited the gross domestic products (GDPs) of at least a few of the countries in Europe and Central Eurasia that produced and exported minerals mainly in crude form (European Commission, 2008; 2011, p. 2, 19-20; Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 18-24; International Monetary Fund, 2010, p. 51-56; World Bank, The, 2010a, p. 24; 2010b, p. xviii).

The World Bank estimated that the combined real gross domestic product (real GDP) of 30 countries in Europe and Central Eurasia (Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Estonia, Georgia, Hungary, Kazakhstan, Kosovo, Kyrgyzstan, Latvia, Lithuania, Macedonia, Moldova, Montenegro, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Tajikistan, Turkey, Turkmenistan, Ukraine, and Uzbekistan) decreased by about 6% in 2009 compared with an increase of about 7% in 2007 and determined the three main factors in the pre-downturn economic growth in these 30 countries to be capital (in)flows, commodity prices, and strong growth in export markets. The World Bank expected that these three drivers of economic growth would have to return to much higher levels than in 2008 or 2009 for a return to anything close to the growth rate in the combined real GDP for these 30 countries in 2007, but the World Bank did not expect economic output to return to even 2008 levels on a widespread basis in most of these countries until possibly 2013 (World Bank, The, 2010a, p. 24; 2010b, p. xix).

Notable exceptions to the overall trend of decreased real GDP in the countries of the region were increases in the real GDP of Azerbaijan (9.3%), Uzbekistan (8.1%), Turkmenistan (6.1%), Tajikistan (3.9%), Albania (3.3%), Kosovo (2.9%), and Kyrgyzstan (2.9%); these seven countries led all the countries in Europe and Central Eurasia in terms of their percentage increases in real GDP. Recoveries in prices for mineral fuel exports during 2009 appeared to benefit at least some of these countries, especially Turkmenistan and Uzbekistan. Still, the combined GDP based on purchasing power parity (GDP-PPP) for all seven countries ($250 billion) was still lower than that of the Czech Republic ($253 billion), which was the 17th ranked country (according to level of GDP-PPP) in all of Europe and Central Eurasia, far lower than third ranked Russia (about $2,110 billion), and only 9% of the GDP-PPP of Germany (about $2,810 billion), which was the leading economy in the region. In 2009, Latvia had the greatest decrease in real GDP (–18%) in the region, followed by Ukraine (–14.8), Lithuania (–14.7), Armenia (–14.2), and Estonia (–13.9). The countries in the region that were not included in the World Bank's 30-country list but that had greater decreases in their real GDPs than the United States (–2.6%) were Finland (–8.2%), Ireland (–7.6%), Iceland (–6.9%), Sweden (–5.3%), Denmark (–5.2%), Italy (–5.2%), the United Kingdom (–4.9%), Germany (–4.7%), Austria (–3.9%), the Netherlands (–3.9%), Luxembourg (–3.7%), Spain (–3.7%), Malta (–3.4%), and Belgium (–2.7%) (table 2; International Monetary Fund, 2010, p. 56-58; 2011; World Bank, The, 2010a, p. 24).

Within the EU, the mineral processing and manufacturing sectors accounted for a significant share of the world production of semimanufactured and fabricated ferrous and nonferrous metals. As a major world mineral processing and consuming area, efficient and secure access to minerals is essential to the competitiveness of industry, to improving the efficiency of value chains, and to the sound functioning of economies within the EU. Although the EU was a major world producer of certain industrial minerals, it remained a net importer of most of them and was mostly dependent on imported mineral raw materials for metals and mineral fuels. In November 2008, the European Commission began an initiative to ensure access to mineral raw materials from international sources, foster a sustainable supply of minerals from within Europe, and reduce consumption of primary minerals in the EU, and this initiative was carried out throughout 2009. As another part of this initiative, the European Commission set up a committee to define the minerals that could be the most critical to the EU economy, based upon projected mineral demand for the EU through 2020 combined with measures of EU import dependence, riskiness of supply by the source countries, and some consideration of such factors as substitutability and recycling rates for minerals. The 14 minerals and mineral groups identified by the committee as the most critical to the EU economy in 2009 were antimony, beryllium, cobalt, fluorspar, gallium, germanium, graphite, indium, magnesium, niobium, platinum-group metals (PGMs), rare earths, tantalum, and tungsten (table 4; European Commission, 2008; 2010, p. 5-6; 2011, p. 2-6, 11-19, 21-22; Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 18-24).

Russia and some of the countries of Central Eurasia were major producers of minerals fuels and related materials and suppliers of primary energy to both Eastern and Western Europe. This energy supply relationship was very important to the economies of both the source and recipient countries. The EU and Russia agreed to establish an early warning system for disruptions of natural gas and petroleum exports from Russia to the EU. In November 2008, the European Commission ordered a revision to the Gas Security of Supply directive (2004/67/EC)

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and was expected to sign an agreement with Russia on the proposed early warning system by the end of 2009. In January 2009, however, gas supplies to the EU were severely disrupted because of a disagreement between Russia and the Ukraine on gas deliveries and payment (European Commission, 2009, p. 2-4; World Bank, The, 2010a, p. 25; 2010b, p. xvii).

Exploration

Some Europe and Central Eurasia countries continued to explore for nonfuel minerals and uranium in 2009. According to the Metals Economics Group (MEG) of Canada, Russia's budget for nonfuel mineral exploration alone amounted to about $370 million and accounted for about 5% of the worldwide total planned exploration budget in 2009. Exploration activity in the Commonwealth of Independent States focused on precious metals (50%), uranium (29%), and base metals (19%). European mineral exploration focused on base metals (48%) and precious metals (35%). Among policies that were expected to affect future mineral exploration in the region, Kazakhstan enacted a new tax code in January 2009 that replaced royalty charges with a mineral extraction tax. Instead of charging royalties on mineral extraction as the Government did previously, a mineral extraction tax rate of 22% of revenue was levied for 2009. This tax was applied to all minerals except uranium, which continued to be taxed using a formula based upon the cost of production. According to a 2010 study by Behre Dolbear Group Inc., Russia ranked among the top five countries for overall perceived political risk (measured according to some combination of seven different risk factors evaluated in the study); the other four countries were Bolivia, the Democratic Republic of the Congo [Congo (Kinshasa)], Indonesia, and Papua New Guinea (table 3; Wilburn and Bourget, 2010).

Mineral Production

Metals

Antimony and Tin.—In 2009, the combined production of mined antimony in the region did not appear to be globally significant (accounting for less than 5% of world production), and reported data on current production were mostly unavailable. Russia and Tajikistan were estimated to be the leading producers, and at least one report indicated that Kazzinc Ltd. (a majority owned subsidiary of Glencore International AG of Switzerland) could be producing antimony as a byproduct of base and precious metals mining in Kazakhstan; however, neither estimated nor reported data for antimony production in Kazakhstan were available. Production of mined antimony in Russia and Tajikistan was mostly estimated based on trade data. The region was also not a globally significant producer of either mined tin or primary tin metal. Russia accounted for almost all the region's production of both commodities, but Russia's production accounted for less than 1% of world production (table 4; Glencore International AG, 2010, p. 64; United Nations, 2010a, b).

Bauxite and Alumina and Aluminum.—The leading producers of alumina in the region were, in decreasing order of production, Russia, Kazakhstan, and Ukraine; of primary aluminum, Russia, Norway, and Iceland; of secondary aluminum, Italy, Germany, and Norway; and of bauxite, Russia, Kazakhstan, and Greece. Recycling was an important component of the mineral industries of many of the countries in the region, especially those of Western Europe, and the region accounted for about 39% of the world production of secondary aluminum metal. The region as a whole accounted for about 24% of world production of primary aluminum and 15% of alumina but only about 7% of mined bauxite (table 4).

Chromium.—Kazakhstan accounted for about 78% of all production of chromite ore in the region and for about 18% of world production. Russia was ranked a distant second with respect to production of chromite in the region. Albania and Finland had notable volumes of chromite production, accounting for greater than 1% of world production in 2009 (table 4; Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 152).

Copper.—The leading producers of mined copper in the region were, in decreasing order of production, Russia, Poland, and Kazakhstan; of primary refined copper, Russia, Poland, and Belgium; and of secondary refined copper, Germany, Russia (estimated), and Austria. Illustrating the relative importance of recycling to many of the mineral industries of Europe and Central Eurasia, the region accounted for about 32% of world production of secondary refined copper but substantially lesser percentages of world production of primary refined copper (20%) and mined copper (about 14%). At the company level, Aurubis AG of Germany was the leading integrated producer of total refined copper in Europe [produced about 1.1 million metric tons (Mt) of copper cathode in 2009] and the leading producer of secondary refined copper in the world. Although Aurubis did not operate any mines, the company produced many base metals (including copper, lead, nickel, tin, and zinc), precious metals (including gold, PGMs, and silver), and other mineral byproducts (including what could be a globally significant volume of refined selenium production) from the processing of imported concentrates and recycling of a wide variety of secondary materials (table 4; Aurubis AG, 2010, p. 1, 17-21, 51-52, 64-66; Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 66-68; George, 2011).

Gold.—In 2009, Europe and Central Eurasia accounted for about 17% of the world's production of mined gold. Russia was by far the leading producer in the region (accounting for 56% of the regional total), followed by Uzbekistan (estimated 25%) and Kazakhstan (about 7%) (table 4).

Iron and Steel.—The region accounted for 20% of the world's production of crude steel, although for lesser percentages of production of primary iron (pig iron plus direct-reduced iron) (about 16%) and iron ore (10%). The substantial difference between the region's tonnage of crude steel production and its production of iron ore and primary iron was apparently accounted for by the use of scrap iron and steel in the production process. Russia was the leading producer of crude steel in the region and the fourth ranked producer in the world; the country was estimated to have produced almost all its crude steel from primary ferrous raw materials (although information concerning the amount of ferrous scrap that might

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have been used to produce crude steel in Russia, if any, was not available). Germany was the second ranked producer of crude steel in the region and the seventh ranked producer in the world. In 2009, secondary raw materials (scrap) accounted for about 45% of all ferrous raw materials used as inputs into the production of crude steel in Germany, and the country imported 100% of the iron ore it used to produce iron and crude steel. (The iron ore produced in Germany is of too low a grade to be used efficiently in metallurgy in the country and is instead used almost entirely as an additive in cement and other construction materials.) In 2009, Germany produced almost all the ferrous scrap used in its production of crude steel domestically, and still imported about 3.9 Mt; Russia imported approximately zero Mt of ferrous scrap during the year (table 4; Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 43-44, 58-61, 145-147; World Steel Association, 2010, p. 9, 26).

Lead.—The region accounted for 25% of the world's production of secondary refined lead, about 14% of primary refined lead, and 9% of mined lead. The United Kingdom was the leading producer of primary refined lead in all of Europe and Central Eurasia despite being estimated to have produced less than 500 metric tons (t) of mined lead, and Germany was the second ranked producer of primary lead in the region despite having produced no mined lead. The leading producers of mined lead in the region were (in decreasing order of tonnage of production) Russia, Sweden, and Macedonia. Typically, most production of secondary lead comes from the recycling of lead-acid batteries used in motor vehicles, and the leading producers of secondary refined lead in the region (Germany, Italy, and the United Kingdom) also had significant automotive sectors (table 4; Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 68-70; Guberman, 2011).

Manganese.—The region was estimated to have accounted for about 9% of world production of manganese ore. In decreasing order of tonnage produced in 2009, the leading producers of manganese ore were estimated to have been Kazakhstan, Ukraine, and Georgia (table 4).

Mercury.—The region was estimated to have accounted for about 18% of the world's mine output of mercury. Kyrgyzstan was estimated to be by far the leading producer in the region, distantly followed by Russia (table 4).

Nickel.—The region accounted for about 36% of world production of nickel contained in refinery products and about 18% of mined nickel. Russia was the dominant producer of mined nickel in the region, as well as the leading producer of nickel (in both forms) in the world (table 4; Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 149-150; Kuck, 2011).

Platinum-Group Metals.—Germany was estimated to have been the leading producer of refined platinum and palladium in the region, and about 45% of production of platinum-group metals (PGMs) in the country was estimated to have been secondary (especially from the recycling of catalytic converters and electronic equipment). All the primary production of refined platinum in Germany was from the processing of imported metallic ores and concentrates (especially as a byproduct of processing copper concentrates). All Germany's production of PGMs is listed as production of refined platinum in table 4, but this figure is estimated to include production of other PGMs (including palladium) in the country. Russia was ranked a close second in the region with respect to total production of refined platinum and palladium, and all the country's production was primary. Further information concerning the reported production of refined platinum in Finland was not available (table 4; Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 73-74; Loferski, 2011).

Silver.—In 2009, Europe and Central Eurasia accounted for about 18% of the world's production of mined silver. Russia was estimated to be the leading producer of silver in the region, and Poland was the second ranked producer (table 4).

Titanium.—In 2009, Europe and Central Eurasia accounted for 12% of world production of ilmenite, and Norway and Ukraine were the dominant producers in the region. The combined production of Norway and Ukraine (estimated) accounted for about 97% of the region's total production of ilmenite (table 4).

Tungsten.—The region accounted for about 7% of world production of mined tungsten. In decreasing order of the tonnage of production, Russia, Austria, and Portugal were estimated to be the only producers in the region (table 4).

Zinc.—Production in the countries of Europe and Central Eurasia combined to account for about 22% of world production of zinc metal and about 13% of mined zinc. In decreasing order of the tonnage of production, the leading producers of mined zinc were Kazakhstan, Ireland, and Russia; the leading producers of combined primary and secondary zinc metal were Spain, Kazakhstan, and Finland (table 4).

Industrial Minerals

In decreasing order of the tonnage of production in 2009, the leading producers of ammonia in Europe and Central Eurasia were Russia, France, and Ukraine (estimated); Russia appeared to be the only producer of diamond in the region and accounted for about 30% of world production. Russia was estimated to be the dominant producer of phosphate rock in the region, and the leading producers of potash in the region were (in decreasing order of production) Russia, Belarus, and Germany. Germany was by far the leading producer of salt in the region, followed by France (estimated), and the Netherlands (estimated) (table 4).

Mineral Fuels and Related Materials

By far the leading producer of anthracite and bituminous coal in Europe and Central Eurasia was Russia, followed by Kazakhstan and Poland. The leading producer of lignite in the region and the world was Germany, followed by (in order of decreasing production) Russia and Greece. By far the leading producer of both crude petroleum and natural gas was Russia, and Norway was the ranked a distant second in the region in the production of both of these mineral fuels. Kazakhstan was estimated to be the third ranked producer of crude petroleum in the region, and the Netherlands and the United Kingdom were estimated to be tied as the third ranked producers of natural gas. Kazakhstan was by far the leading producer of uranium in the region, followed by Russia and Uzbekistan (table 4).

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Although Russia and many countries in Central Eurasia were major producers and exporters of primary energy to other countries in the region in 2009, the production of mineral fuels and related materials within many of the countries of Eastern Europe and Central Eurasia could be more uncertain in the long run. According to the World Bank, without a $3.3 trillion investment in development of primary energy sources (including in future capacity to produce mineral fuels and related materials) and in power sector infrastructure, as well as changes in behavior, Eastern Europe and Central Eurasia could face a shortage in primary energy supply and move from being a net exporter of energy to being a net importer of energy by 2030 to 2035 (Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 18-24; World Bank, The, 2010a, p. 25; 2010b, p. xvii-xxv; 2010c).

References Cited

Aurubis AG, 2010, Annual report 2009/10: Hamburg, Germany, Aurubis AG, 168 p.

Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, Rohstoffsituation 2009: Hannover, Germany, Bundesanstalt für Geowissenschaften und Rohstoffe, November, 205 p.

Council of Europe, 2011, 47 countries—One Europe: Strasbourg, France, Council of Europe. (Accessed August 31, 2011, at http://www.coe.int/aboutCoe/index.asp?page=47pays1europe&l=en.)

European Central Bank, 2010, Annual report 2009: Frankfurt, Germany, European Central Bank, April 6, 268 p.

European Commission, 2008, The raw materials initiative—Meeting our critical needs for growth and jobs in Europe: Brussels, Belgium, Communication from the Commission to the European Parliament and the Council, COM(2008) 699, November 4, 13 p.

European Commission, 2009, The January 2009 gas supply disruption to the EU—An assessment—Accompanying document to the proposal for a regulation of the European Parliament and of the Council concerning measures to safeguard security of gas supply and repealing Directive 2004/67/EC: Brussels, Belgium, European Commission staff working document no. SEC(2009) 977, July 16, 23 p.

European Commission, 2010, Critical raw materials for the EU—Report of the ad-hoc working group on defining critical raw materials: Brussels, Belgium, European Commission, June 17, 85 p.

European Commission, 2011, Tackling the challenges in commodity markets and on raw materials: Brussels, Belgium, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee of the Regions, COM(2011) 25, February 2, 22 p.

European Free Trade Area, 2010, 49th annual report of the European Free Trade Association 2009: Geneva, Switzerland, European Free Trade Area, May, 52 p.

George, M.W., 2011, Selenium: U.S. Geological Survey Mineral Commodity Summaries 2011, p. 142-143.

Glencore International AG, 2010, Annual report 2009: Glencore International AG, Baar, Switzerland, March 5, 68 p.

Guberman, D.E., 2011, Lead, *in* Metals and minerals: U.S. Geological Survey Minerals Yearbook 2009, v. I, p. 42.1-42.22. (Accessed May 3, 2011, at http://minerals.er.usgs.gov/minerals/pubs/commodity/lead/myb1-2009-lead.pdf.)

International Monetary Fund, 2010, World economic outlook—April 2010: Washington, D.C., International Monetary Fund, April 14, 195 p.

International Monetary Fund, 2011, Report for selected country groups and subjects, *in* World economic outlook database: International Monetary Fund, April. (Accessed August 25, 2011, via http://www.imf.org/external/pubs/ft/weo/2011/01/weodata/index.aspx.)

Kuck, P.H., 2011, Nickel: U.S. Geological Survey Mineral Commodity Summaries 2011, p. 108-109.

Loferski, P.J., 2011, Platinum-group metals: U.S. Geological Survey Mineral Commodity Summaries 2011, p. 120-121.

United Nations, 2010a, Antimony ores and concentrates, *in* United Nations commodity trade statistics database: New York, United Nations. (Accessed September 16, 2011, via http://comtrade.un.org/db/.)

United Nations, 2010b, Unwrought antimony; powders, *in* United Nations commodity trade statistics database: New York, United Nations. (Accessed September 16, 2011, via http://comtrade.un.org/db/.)

Wilburn, D.R., and Bourget, M.R., 2010, Exploration review: Mining Engineering, v. 62, no. 5, p. 39-52.

World Bank, The, 2010a, Annual report 2010: Washington, D.C., The World Bank, October 20, 32 p.

World Bank, The, 2010b, Lights out?—The outlook for energy in Eastern Europe and the former Soviet Union: Washington, D.C., The World Bank, March 18, 130 p.

World Bank, The, 2010c, The World Bank data—Countries and economies 2009: The World Bank. (Accessed February 16, 2011, at http://data.worldbank.org/country.)

World Steel Association, 2010, World steel in figures 2010: Brussels, Belgium, World Steel Association, July 13, 26 p.

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TABLE 1
EUROPE AND CENTRAL EURASIA: AREA AND POPULATION IN 2009

Country	Area[1] (square kilometers)	Estimated population[2] (thousands)
Albania	28,748	3,155
Armenia	29,743	3,083
Austria	83,871	8,364
Azerbaijan	86,600	8,781
Belarus	207,600	9,663
Belgium	30,528	10,789
Bosnia and Herzegovina	51,197	3,767
Bulgaria	110,879	7,585
Croatia	56,594	4,432
Cyprus	9,251	871
Czech Republic	78,867	10,490
Denmark, including Greenland	2,209,180	5,529
Estonia	45,228	1,340
Finland	338,145	5,338
France	551,500	62,616
Georgia	69,700	4,260
Germany	357,022	81,880
Greece	131,957	11,283
Hungary	93,028	10,022
Iceland	103,000	319
Ireland	70,273	4,450
Italy	301,340	60,221
Kazakhstan	2,724,900	15,888
Kosovo	10,887	1,815 [1]
Kyrgyzstan	199,951	5,321
Latvia	64,589	2,255
Lithuania	65,300	3,340
Luxembourg	2,586	498
Macedonia	25,713	2,042
Malta	316	415
Moldova	33,851	3,604
Montenegro	13,812	624
Netherlands	41,543	16,531
Norway	323,802	4,827
Poland	312,685	38,150
Portugal	92,090	10,632
Romania	238,391	21,482
Russia	17,098,242	141,850
Serbia	77,474	7,345 [1]
Slovakia	49,035	5,418
Slovenia	20,273	2,043
Spain	505,370	45,960
Sweden	450,295	9,302
Switzerland	41,277	7,731
Tajikistan	143,100	6,952
Turkmenistan	488,100	5,110
Ukraine	603,550	46,008
United Kingdom	243,610	61,838
Uzbekistan	447,400	27,767
Regional total	29,362,393	812,986
World total	148,940,000	6,775,236

[1]Source: U.S. Central Intelligence Agency, The World Factbook 2010.

[2]Source: The World Bank, 2010, The World Bank Data—Countries and economies 2009.

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TABLE 2

EUROPE AND CENTRAL EURASIA: GROSS DOMESTIC PRODUCT[1, 2]

Country	Gross domestic product based on purchasing power parity in 2009		Real gross domestic product growth rate (percentage)		
	Gross value (million dollars)	Per capita (dollars)	2007	2008	2009
Albania	22,823	7,164	5.9	7.7	3.3
Armenia	16,222	4,966	13.7	6.9	-14.2
Austria	322,506	38,839	3.7	2.2	-3.9
Azerbaijan	85,770	9,564	25.0	10.8	9.3
Belarus	120,750	12,737	8.6	10.2	0.2
Belgium	382,749	35,422	2.8	0.8	-2.7
Bosnia and Herzegovina	29,477	7,361	6.1	5.7	-3.1
Bulgaria	90,068	11,900	6.4	6.2	-5.5
Croatia	78,539	17,703	5.5	2.4	-5.8
Cyprus	22,746	28,544	5.1	3.6	-1.7
Czech Republic	252,951	24,093	6.1	2.5	-4.1
Denmark, including Greenland	197,058	35,757	1.6	-1.1	-5.2
Estonia	24,004	17,908	6.9	-5.1	-13.9
Finland	179,598	33,556	5.3	0.9	-8.2
France	2,108,228	33,679	2.3	0.1	-2.5
Georgia	20,862	4,757	12.3	2.4	-3.8
Germany	2,806,266	34,212	2.8	0.7	-4.7
Greece	341,688	30,681	4.3	1.0	-2.0
Hungary	185,873	18,567	0.8	0.8	-6.7
Iceland	12,147	38,023	6.0	1.4	-6.9
Ireland	175,055	39,468	5.6	-3.5	-7.6
Italy	1,740,123	29,109	1.5	-1.3	-5.2
Kazakhstan	182,044	11,693	8.9	3.2	1.2
Kosovo[3]	5,300	2,500	6.3	6.9	2.9
Kyrgyzstan	12,101	2,253	8.5	7.6	2.9
Latvia	32,234	14,255	10.0	-4.2	-18.0
Lithuania	55,162	16,542	9.8	2.9	-14.7
Luxembourg	38,808	78,395	6.6	1.4	-3.7
Macedonia	18,902	9,171	6.1	5.0	-0.9
Malta	9,817	23,584	4.4	5.3	-3.4
Moldova	10,141	2,843	3.0	7.8	-6.0
Montenegro	6,506	10,393	10.7	6.9	-5.7
Netherlands	658,228	39,938	3.9	1.9	-3.9
Norway	254,537	52,561	2.7	0.8	-1.4
Poland	688,761	18,072	6.8	5.1	1.7
Portugal	232,656	21,859	2.4	0.0	-2.5
Romania	255,207	11,917	6.3	7.3	-7.1
Russia	2,109,551	14,920	8.5	5.2	-7.8
Serbia	78,506	10,635	6.9	5.5	-3.1
Slovakia	115,098	21,245	10.5	5.8	-4.8
Slovenia	55,741	27,654	6.9	3.7	-8.1
Spain	1,360,605	29,689	3.6	0.9	-3.7
Sweden	331,504	35,965	3.3	-0.6	-5.3
Switzerland	314,869	43,007	3.6	1.9	-1.9
Tajikistan	13,666	2,104	7.8	7.9	3.9
Turkmenistan	31,966	5,971	11.1	14.7	6.1
Ukraine	289,739	6,339	7.9	1.9	-14.8
United Kingdom	2,139,400	34,619	2.7	-0.1	-4.9
Uzbekistan	78,338	2,807	9.5	9.0	8.1
Regional total	18,594,890	XX	XX	XX	XX
World total	69,808,807	XX	5.2	6.0	2.4

XX Not applicable.

[1]Source: International Monetary Fund, World Economic Outlook Database, April 2011.

[2]Gross domestic product listed may differ from that reported in individual country chapters owing to differences in source or date of reporting.

[3]Real gross domestic product growth rates from the International Monetary Fund's World Economic Outlook Database, April 2011, and the U.S. Central Intelligence Agency's World Factbook 2010.

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TABLE 3
SELECTED EXPLORATION ACTIVITY IN EUROPE AND CENTRAL EURASIA IN 2009

Country	Site	Commodity[1]	Company	Phase[2]
Armenia	Almulsar	Au	Lydian International Ltd.	Exploration.
Finland	Kittila	Au	Agnico-Eagle Mines Ltd.	Producer.
Kazakhstan	Bakyrchik	Au	Altynalmas Gold plc.	Exploration.
Kyrgyzstan	Chaarat	Au	Chaarat Gold Holdings Ltd.	Exploration.
Russia	Kubaka	Au, Ag	Polymetal MNPO	Developing.
Do.	Mangazeisky	Ag	Silver Bear Resources Inc.	Exploration.
Spain	Las Cruces	Cu	Inmet Mining Corp.	Producer.

Do. ditto.

[1]Abbreviations used in this table for commodities are as follows: Ag, silver; Au, gold; Cu, copper.

[2]Phase of exploration activity has been separated into the following stages: Developing, includes construction and permitting; Exploration, exploration prior to full feasibility study; Feasibility, feasibility study ongoing or completed; Producer, exploration at producing site.

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TABLE 4

EUROPE AND CENTRAL EURASIA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2009[1, 2]

(Thousand metric tons unless otherwise specified)

	Metals								
	Aluminum				Antimony, mine output,	Chromite,	Copper		
			Metal		metal content	mine output,	Mine output,	Metal, refined	
Region and (or) country	Alumina	Bauxite	Primary[3]	Secondary	(metric tons)	gross weight	metal content	Primary[3]	Secondary
Europe and Central Eurasia:									
Albania	--	--	--	--	--	256	2 e	--	--
Armenia	--	--	--	--	--	--	19 e	--	--
Austria	--	--	--	100 e	--	--	--	--	96 p
Azerbaijan	40	--	30 e	--	--	--	--	--	--
Belarus	--	--	--	--	--	--	--	--	--
Belgium	--	--	--	(4) e	--	--	--	395	--
Bosnia and Herzegovina	192	556	96	--	--	--	--	--	--
Bulgaria	--	--	--	12 e	--	--	105	197	--
Croatia	--	--	--	--	--	--	--	--	--
Cyprus	--	--	--	--	--	--	--	3 e	--
Czech Republic	--	--	--	45 e	--	--	--	--	--
Denmark, including Greenland	--	--	--	25 e	--	--	--	--	--
Estonia	--	--	--	--	--	--	--	--	--
Finland	--	--	--	14	--	247	13 e	106	--
France	348 e	160 e	345	138	--	--	--	--	--
Georgia	--	--	--	--	--	--	9 e	--	--
Germany	900 e	--	292	561	--	--	--	290	379
Greece	719	1,935	135	3 e	--	1 e	--	--	--
Hungary	185	317	--	50 e	--	--	--	--	--
Iceland	--	--	785 e	--	--	--	--	--	--
Ireland	1,240	--	--	--	--	--	--	--	--
Italy	753	--	180	827	--	--	--	7 e	--
Kazakhstan	1,608	5,130	127	--	--	3,333	390 e	368	--
Kosovo	--	--	--	--	--	--	--	--	--
Kyrgyzstan	--	--	--	--	10 e	--	--	--	--
Latvia	--	--	--	--	--	--	--	--	--
Lithuania	--	--	--	--	--	--	--	--	--
Luxembourg	--	--	--	--	--	--	--	--	--

See footnotes at end of table.

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TABLE 4—Continued

EUROPE AND CENTRAL EURASIA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2009[1, 2]

(Thousand metric tons unless otherwise specified)

Region and (or) country	Metals								
	Aluminum				Antimony, mine output, metal content (metric tons)	Chromite, mine output, gross weight	Copper		
			Metal				Mine output, metal content	Metal, refined	
	Alumina	Bauxite	Primary[3]	Secondary				Primary[3]	Secondary
Europe and Central Eurasia—Continued:									
Macedonia	--	--	--	--	--	--	8 e	--	--
Malta	--	--	--	--	--	--	--	--	--
Moldova	--	--	--	--	--	--	--	--	--
Montenegro	59	46	64	--	--	--	--	--	--
Netherlands	--	--	317 e	--	--	--	--	--	--
Norway[e]	--	--	1,130	350	--	--	--	32	--
Poland	--	--	17	15 e	--	--	439	502	--
Portugal	--	--	--	18 e	--	--	87	--	--
Romania	44	--	201	11	--	--	1 e	15	3 e
Russia	2,794	5,775	3,815	--	3,500 e	416	825 e	605	250 e
Serbia[e]	--	--	--	2 [5]	--	--	19	33	1
Slovakia	--	--	150	--	--	--	--	--	--
Slovenia	--	--	35	10 e	--	--	--	--	--
Spain[e]	1,500	--	408	243	--	--	7 [5]	255	35
Sweden[e]	--	--	98	30	--	--	46 [5]	225	25
Switzerland	--	--	--	(4) e	--	--	--	--	--
Tajikistan	--	--	359	--	2,000 e	--	--	--	--
Turkmenistan	--	--	--	--	--	--	--	--	--
Ukraine	1,524	--	50	130 e	--	--	--	--	20
United Kingdom	--	--	253	288	--	--	--	--	--
Uzbekistan[e]	--	--	--	3	--	--	100	95	--
Total, Europe and Central Eurasia	11,900	13,900	8,890	2,880	5,510 e	4,250	2,070	3,130	809
Share of world total	15.2%	7.1%	23.9%	39.2%	3.6%	22.6%	13.6%	19.9%	31.9%
United States	3,060	NA	1,730	--	--	--	1,180	1,110	46
Share of world total	3.9%	NA	4.7%	--	--	--	7.7%	7.1%	1.8%
World total	78,400	197,000	37,100	7,340	153,000	18,800	15,300	15,700	2,530

See footnotes at end of table.

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EUROPE AND CENTRAL EURASIA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2009[1, 2]

(Thousand metric tons unless otherwise specified)

Region and (or) country	Metals—Continued								
		Iron and steel			Lead				
	Gold, mine output (kilograms)	Iron ore, mine output, metal content	Pig iron and direct-reduced iron	Steel, crude	Mine output, metal content	Metal, refined		Manganese ore, mine output, metal content	Mercury, mine output, metal content (metric tons)
						Primary[3]	Secondary		
Europe and Central Eurasia:									
Albania	--	--	--	440	--	--	--	--	--
Armenia	1,400 e	--	--	--	--	--	--	--	--
Austria	--	480 e	4,562	5,662	--	--	20 e	--	--
Azerbaijan	--	--	--	50 e	--	--	--	--	--
Belarus	--	--	--	2,449	--	--	--	--	--
Belgium	--	--	3,087	5,635	--	--	81 e	--	--
Bosnia and Herzegovina	--	678 e	482	519	2 e	(4)	--	--	--
Bulgaria	4,300 e	--	--	726	18	83	--	11 e	--
Croatia	--	--	--	52	--	--	--	--	--
Cyprus	--	--	--	--	--	--	--	--	--
Czech Republic	--	--	3,483	4,594	--	--	34	--	--
Denmark, including Greenland	1,600 e	--	--	--	--	--	--	--	--
Estonia	--	--	--	--	--	--	9	--	--
Finland	1,785	--	16	3,078	--	--	--	--	6
France	1,500 e	--	8,104	12,840	--	5	82 e	--	--
Georgia e	2,000	--	--	--	(4)	--	--	102	--
Germany	--	38	20,484	32,671	--	105 p	286 p	--	--
Greece	--	560 e	--	2,082	17	--	10 e	(4) e	--
Hungary	--	--	1,050	1,401	--	--	--	5 e	--
Iceland	--	--	--	--	--	--	--	--	--
Ireland	--	--	--	--	43	--	19 e	--	--
Italy	--	--	5,692	19,848	1 e	5 e	164 e	--	--
Kazakhstan	22,525	12,800 e	2,700 e	4,147	39	88	--	595 e	--
Kosovo	--	--	--	--	5	--	--	--	--
Kyrgyzstan	16,950	--	--	--	--	--	--	--	250 e
Latvia	--	--	--	550 e	--	--	--	--	--
Lithuania	--	--	--	--	--	--	--	--	--
Luxembourg	--	--	--	2,215	--	--	--	--	--

See footnotes at end of table.

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TABLE 4—Continued

EUROPE AND CENTRAL EURASIA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2009[1, 2]

(Thousand metric tons unless otherwise specified)

Region and (or) country	Metals—Continued								
		Iron and steel			Lead				
	Gold, mine output (kilograms)	Iron ore, mine output, metal content	Pig iron and direct-reduced iron	Steel, crude	Mine output, metal content	Metal, refined		Manganese ore, mine output, metal content	Mercury, mine output, metal content (metric tons)
						Primary[3]	Secondary		
Europe and Central Eurasia—Continued:									
Macedonia	--	--	--	276	52	--	--	--	--
Malta	--	--	--	--	--	--	--	--	--
Moldova	--	--	--	426	--	--	--	--	--
Montenegro	--	--	--	50 e	--	--	--	--	--
Netherlands	--	--	4,600	5,200	--	--	--	--	--
Norway	--	896	100 e	579	--	--	--	--	--
Poland	440 e	--	2,984	7,129	34	36 e	60 e	--	--
Portugal[e]	--	10	100	1,400	--	--	3	--	--
Romania	400 e	--	1,611	2,699	--	9	3 e	3 e	--
Russia[e]	190,693 [5]	53,200	47,930 [5]	59,166 [5]	70	73	--	9	50
Serbia	500 e	--	1,006	1,097	2 e	1 e	--	--	--
Slovakia	90 e	130 e	3,019	3,747	--	--	--	--	--
Slovenia	--	--	--	436	--	--	14 e	--	--
Spain[e]	3,400	--	4,200	19,000	--	--	125 [5]	--	--
Sweden[e]	5,600	11,300	1,966 [5]	2,805 [5]	65	55	42	--	--
Switzerland	--	--	--	984	--	--	5 e	--	--
Tajikistan	1,361	--	--	--	1 e	--	--	--	(4) e
Turkmenistan	--	--	--	--	--	--	--	--	--
Ukraine	--	36,600 e	25,683	29,855	--	--	8	316 e	--
United Kingdom	--	--	7,671	10,079	(4) e	135 e	144 e	--	--
Uzbekistan	85,000 e	--	--	716	--	--	--	--	--
Total, Europe and Central Eurasia	340,000	117,000	151,000	245,000	348	594	1,110	1,040	306
Share of world total	16.5%	10.0%	15.6%	19.9%	9.0%	14.4%	24.9%	8.6%	17.7%
United States	223,000	16,600	19,000	59,400	406	103	1,110	--	NA
Share of world total	10.9%	1.4%	2.0%	4.8%	10.5%	2.5%	24.9%	--	NA
World total	2,060,000	1,160,000	962,000	1,230,000	3,860	4,120	4,460	12,100	1,730

See footnotes at end of table.

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EUROPE AND CENTRAL EURASIA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2009[1, 2]

(Thousand metric tons unless otherwise specified)

Region and (or) country	Metals—Continued								
	Nickel		Platinum-group metals, refined, primary and secondary (kilograms)		Silver, mine output, metal content (metric tons)	Tin (metric tons)		Titanium (metric tons)	
	Mine output, metal content	Refinery products, metal content	Palladium	Platinum		Mine output, metal content	Metal, primary[3]	Ilmenite, TiO_2 content	Metal sponge, metal content
Europe and Central Eurasia:									
Albania	--	--	--	--	--	--	--	--	--
Armenia	--	--	--	--	4 e	--	--	--	--
Austria	--	--	--	--	--	--	--	--	--
Azerbaijan	--	--	--	--	--	--	--	--	--
Belarus	--	--	--	--	--	--	--	--	--
Belgium	--	--	--	--	--	--	--	--	--
Bosnia and Herzegovina	--	--	--	--	--	--	--	--	--
Bulgaria	--	--	--	--	55 e	--	1 e	--	--
Croatia	--	--	--	--	--	--	--	--	--
Cyprus	--	--	--	--	--	--	--	--	--
Czech Republic	--	--	--	--	--	--	--	--	--
Denmark, including Greenland	--	--	--	--	--	--	--	--	--
Estonia	--	--	--	--	--	--	--	--	--
Finland	4 e	10	--	265	60	--	--	--	--
France	--	14	--	--	--	--	--	--	--
Georgia	--	--	--	--	1 e	--	--	--	--
Germany	--	--	--	110,000 e	--	--	--	--	--
Greece	8	19 e	--	--	36 e	--	--	--	--
Hungary	--	--	--	--	--	--	--	--	--
Iceland	--	--	--	--	--	--	--	--	--
Ireland	--	--	--	--	8 e	--	--	--	--
Italy	--	--	--	--	(4) e	--	--	--	--
Kazakhstan	--	1 e	--	--	678	--	--	15,000	16,800
Kosovo	4	6 e	--	--	--	--	--	--	--
Kyrgyzstan	--	--	--	--	NA	--	--	--	--
Latvia	--	--	--	--	--	--	--	--	--
Lithuania	--	--	--	--	--	--	--	--	--
Luxembourg	--	--	--	--	--	--	--	--	--

See footnotes at end of table.

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TABLE 4—Continued
EUROPE AND CENTRAL EURASIA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2009[1, 2]

(Thousand metric tons unless otherwise specified)

Region and (or) country	Metals—Continued								
	Nickel		Platinum-group metals, refined, primary and secondary (kilograms)		Silver, mine output, metal content (metric tons)	Tin (metric tons)		Titanium (metric tons)	
	Mine output, metal content	Refinery products, metal content	Palladium	Platinum		Mine output, metal content	Metal, primary[3]	Ilmenite, TiO_2 content	Metal sponge, metal content
Europe and Central Eurasia—Continued:									
Macedonia	--	12	--	--	--	--	--	--	--
Malta	--	--	--	--	--	--	--	--	--
Moldova	--	--	--	--	--	--	--	--	--
Montenegro	--	--	--	--	--	--	--	--	--
Netherlands	--	--	--	--	--	--	--	--	--
Norway	(4)	87 e	--	--	--	--	--	289,000	--
Poland	--	--	15 e	25 e	1,206	--	--	--	--
Portugal	--	--	--	--	22	34	--	--	--
Romania	--	--	--	--	18 e	--	--	--	--
Russia e	262 5	259 5	83,200 5	21,000	1,400	1,200	1,650	--	26,600
Serbia e	--	--	15	2	4	--	--	--	--
Slovakia	--	--	--	--	--	--	--	--	--
Slovenia	--	--	--	--	--	--	--	--	--
Spain	8	--	--	--	3 e	--	--	--	--
Sweden e	--	(4)	--	--	290	--	--	--	--
Switzerland	--	--	--	--	--	--	--	--	--
Tajikistan	--	--	--	--	5 e	--	--	--	--
Turkmenistan	--	--	--	--	--	--	--	--	--
Ukraine	--	12	--	--	--	--	--	295,000 e	7,000 e
United Kingdom	--	38 e	--	--	--	--	--	--	--
Uzbekistan	--	--	--	--	83 e	--	--	--	--
Total, Europe and Central Eurasia	287	458	83,200	131,000	3,870	1,230	1,650	599,000	50,400
Share of world total	18.2%	35.7%	43.6%	45.3%	17.7%	0.4%	0.5%	12.0%	45.0%
United States	--	--	12,700	3,830	1,240	--	--	164,000	--
Share of world total	--	--	6.6%	1.3%	5.7%	--	--	3.3%	--
World total	1,580	1,280	191,000	290,000	21,900	275,000	310,000	4,990,000	112,000

See footnotes at end of table.

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TABLE 4—Continued

EUROPE AND CENTRAL EURASIA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2009[1, 2]

(Thousand metric tons unless otherwise specified)

Region and (or) country	Metals—Continued			Industrial minerals					
	Tungsten, mine output, metal content (metric tons)	Zinc (metric tons)		Ammonia, N content	Cement, hydraulic	Diamond, natural, gemstones and industrial (thousand carats)	Phosphate rock, P_2O_5 content	Potash, K_2O equivalent	Salt
		Mine output, metal content	Metal, primary and secondary						
Europe and Central Eurasia:									
Albania[e]	--	--	--	--	740	--	--	--	25
Armenia	--	3,400 [e]	--	--	467	--	--	--	35 [e]
Austria[e]	900	--	--	300	4,600	--	--	--	1,000
Azerbaijan	--	--	--	--	1,283	--	--	--	5
Belarus	--	--	--	892	4,350	--	--	2,485	1,695
Belgium[e]	--	--	279,000	830	9,500	--	--	--	--
Bosnia and Herzegovina	--	3,400 [e]	--	1 [e]	1,074	--	--	--	556
Bulgaria[e]	--	10,700	92,000 [5]	320	3,000	--	--	--	1,900
Croatia	--	--	--	308 [e]	2,838	--	--	--	33 [e]
Cyprus	--	--	--	--	1,481	--	--	--	--
Czech Republic	--	--	--	200 [e]	3,637	--	--	--	--
Denmark, including Greenland	--	--	--	2 [e]	1,578	--	--	--	600 [e]
Estonia	--	--	--	20	326	--	--	--	--
Finland	--	56,415	295,049	68	1,052	--	250 [e]	--	--
France	--	--	118 [e]	2,970	18,300	--	--	--	6,200 [e]
Georgia[e]	--	300	--	125	400	--	--	--	30
Germany	--	--	153,000 [e]	2,363	30,441 [p]	--	--	1,825	18,939
Greece[e]	--	18,126 [5]	--	130	15,000	--	--	--	189
Hungary[e]	--	--	--	300	3,200	--	--	--	--
Iceland[e]	--	--	--	--	138	--	--	--	5
Ireland	--	357,000	--	--	2,600 [e]	--	--	--	--
Italy	--	--	100,000 [e]	2,321	36,317	--	--	--	3,471
Kazakhstan	--	418,600	328,834	--	5,998	--	280 [e]	--	213
Kosovo	--	3,690	--	--	600 [e]	--	--	--	--
Kyrgyzstan	--	--	--	--	1,100	--	--	--	1 [e]
Latvia	--	--	--	--	300 [e]	--	--	--	--
Lithuania	--	--	--	--	583	--	--	--	--
Luxembourg	--	--	--	--	700 [e]	--	--	--	--

See footnotes at end of table.

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TABLE 4—Continued
EUROPE AND CENTRAL EURASIA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2009[1, 2]

(Thousand metric tons unless otherwise specified)

Region and (or) country	Metals—Continued			Industrial minerals					
	Tungsten, mine output, metal content (metric tons)	Zinc (metric tons)		Ammonia, N content	Cement, hydraulic	Diamond, natural, gemstones and industrial (thousand carats)	Phosphate rock, P_2O_5 content	Potash, K_2O equivalent	Salt
		Mine output, metal content	Metal, primary and secondary						
Europe and Central Eurasia—Continued:									
Macedonia	--	32,000	--	--	909	--	--	--	--
Malta	--	--	--	--	--	--	--	--	6 e
Moldova	--	--	--	--	700 e	--	--	--	--
Montenegro	--	--	--	--	--	--	--	--	17
Netherlands e	--	--	224,000	1,800	2,700	--	--	--	6,000
Norway e	--	--	138,973 5	300	1,700	--	--	--	--
Poland	--	104,000	140,000	1,697	15,537	--	--	--	3,523
Portugal	823	501	--	244 e	6,900	--	--	--	577
Romania e	--	--	4,000	1,100	7,800	--	--	--	2,040
Russia e	2,500	225,000	225,000	10,441 5	44,300 5	32,791 5	4,500	3,727 5	2,200
Serbia	--	1,000 e	--	53 e	2,232	--	--	--	29
Slovakia	--	--	--	260 e	3,021	--	--	--	100 e
Slovenia e	--	--	--	--	1,000	--	--	--	2
Spain	--	--	500,776	400 e	29,505	--	--	435 e	4,058
Sweden	--	192,538	--	--	2,600 e	--	--	--	--
Switzerland e	--	--	--	30	4,000	--	--	--	435 5
Tajikistan e	--	--	--	25	190	--	--	--	52
Turkmenistan e	--	--	--	270	900	--	--	--	215
Ukraine	--	--	--	2,500 e	9,496	--	--	12 e	5,395
United Kingdom e	--	--	--	1,100	10,000	--	--	366 5	5,800
Uzbekistan e	--	--	70,000	1,000	6,700	--	140	--	--
Total, Europe and Central Eurasia	4,220	1,430,000	2,550,000	32,400	302,000	32,800	5,170	8,850	65,300
Share of world total	6.8%	12.6%	22.4%	24.8%	10.1%	29.9%	10.3%	43.1%	24.2%
United States	--	736,000	203,000	7,700	64,900	--	7,640	715	46,100
Share of world total	--	6.5%	1.8%	5.9%	2.2%	--	15.3%	3.5%	17.0%
World total	62,400	11,300,000	11,400,000	131,000	3,000,000	109,000	50,000	20,600	270,000

See footnotes at end of table.

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TABLE 4—Continued
EUROPE AND CENTRAL EURASIA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2009[1, 2]

(Thousand metric tons unless otherwise specified)

Region and (or) country	Mineral fuels and related materials					
	Coal			Natural gas, dry (million cubic meters)	Petroleum, crude (thousand 42-gallon barrels)	Uranium, U_3O_8 content (metric tons)
	Anthracite	Bituminous	Lignite			
Europe and Central Eurasia:						
Albania[e]	--	--	2	13	4,200	--
Armenia	--	--	--	3,000 [e]	--	--
Austria[e]	--	--	--	1,500	6,000	--
Azerbaijan	--	--	--	16,325	370,050	--
Belarus	--	--	--	205	12,600	--
Belgium	--	--	--	--	--	--
Bosnia and Herzegovina	--	--	11,515	--	--	--
Bulgaria	--	18 [e]	27,200 [e]	12	176	--
Croatia	--	--	--	2,717	5,760 [e]	--
Cyprus	--	--	--	--	--	--
Czech Republic	--	10,631	45,616	180	1,500 [e]	337 [e]
Denmark, including Greenland	--	--	--	9,600 [e]	97,455	--
Estonia	--	--	--	--	--	--
Finland	--	--	--	--	--	--
France	--	--	--	1,444	6,624	--
Georgia[e]	--	NA	--	NA	NA	--
Germany	1,924	11,842	169,857	14,380	20,500	--
Greece	--	--	62,730	11	628	--
Hungary[e]	--	--	9,370	2,517 [5]	4,970	--
Iceland	--	--	--	--	--	--
Ireland	--	--	--	413	--	--
Italy	--	--	--	8,127	30,215	--
Kazakhstan	--	90,888	4,882	18,132	565,000 [e]	16,534
Kosovo	--	--	7,839	--	--	--
Kyrgyzstan	--	136	469	15	551	--
Latvia	--	--	--	--	--	--
Lithuania	--	--	--	--	844	--
Luxembourg	--	--	--	--	--	--

See footnotes at end of table.

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TABLE 4—Continued

EUROPE AND CENTRAL EURASIA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2009[1, 2]

(Thousand metric tons unless otherwise specified)

	Mineral fuels and related materials					
	Coal			Natural gas, dry (million	Petroleum, crude (thousand	Uranium, U_3O_8 content
Region and (or) country	Anthracite	Bituminous	Lignite	cubic meters)	42-gallon barrels)	(metric tons)
Europe and Central Eurasia—Continued:						
Macedonia	--	--	7,454	--	--	--
Malta	--	--	--	--	--	--
Moldova	--	--	--	50 [e]	--	--
Montenegro	--	--	957	--	--	--
Netherlands	--	--	--	68,000 [e]	9,300	--
Norway	--	244	--	99,000 [e]	854,830	--
Poland	--	78,064	57,108	5,537	5,100	--
Portugal	--	--	--	--	1,728	--
Romania[e]	--	--	30,000	10,859 [5]	33,700	88
Russia	6,560	222,042	68,158	583,610	3,630,000 [e]	4,203
Serbia	--	69	38,828	283	4,920 [e]	--
Slovakia[e]	--	--	2,572 [5]	110	140	--
Slovenia	--	--	4,429	3	1 [e]	--
Spain	6,952	2,892	--	20	250	--
Sweden	--	--	--	--	--	--
Switzerland	--	--	--	--	--	--
Tajikistan	--	142	--	22	192	--
Turkmenistan[e]	--	--	--	35,000	44,100	--
Ukraine[e]	13,000	59,000	200	21 [5]	28,500	980
United Kingdom	1,446	16,608	--	68,000 [e]	484,643	--
Uzbekistan	--	--	2,300	65,000	17,100	2,700
Total, Europe and Central Eurasia	29,900	493,000	551,000	1,010,000	6,240,000	24,800
Share of world total	4.8%	9.6%	53.3%	34.9%	23.4%	43.9%
United States	1,760	906,000	65,800	593,000	1,960,000	1,880
Share of world total	0.3%	17.6%	6.4%	20.4%	7.3%	3.3%
World total	620,000	5,140,000	1,030,000	2,900,000	26,700,000	56,600

[e]Estimated; estimated data, U.S. data, and world totals are rounded to no more than three significant digits; may not add to totals shown. NA Not available.

-- Zero or zero percent.

[1]Some of the individual entries in this table may differ from those that appear in individual country production tables elsewhere in this volume owing to the inclusion in this table of data received at a later date.

[2]Totals may not add due to independent rounding. Table includes data available as of February 28, 2011.

[3]Primary production also includes undifferentiated (primary and secondary) production for some countries listed.

[4]Less than ½ unit.

[5]Reported figure.

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The Mineral Industry of Albania

By Mark Brininstool

Albania's important mineral deposits included chromium, copper, limestone, and petroleum. Production of mineral commodities was limited, but the number of exploration projects increased as Albania continued to attract international exploration companies.

Minerals in the National Economy

In 2009, Albania's gross domestic product (GDP) increased by 2.8% and the rate of inflation was 2.2%. In 2008 (the most recent year for which data were available), industrial production made up about 9% of the GDP, and the mineral extraction industry accounted for about 10% of the value of industrial production and almost 1% of the GDP (Institute of Statistics of the Republic of Albania, 2010; International Monetary Fund, 2010, p. 159, 165).

Production

Production data for mineral commodities in 2009 were entirely estimated with the exception of ferrochromium, chromite, and crude steel production. Production of chromite and crude steel increased by 24%, and 16%, respectively, compared with that of 2008. Rolled steel production was estimated to have increased by about 16% and crude petroleum production was estimated to have increased by 5%. Production of ferrochromium decreased by about 37%. Revised figures for 2008 show that a number of significant production increases and decreases occurred between 2007 and 2008. In 2008, silica sand production increased by 174% compared with that of 2007; limestone production increased by 124%; gypsum production, by 68%; bitumen production, by 33%; crude steel production, by 44%; rolled steel production, by 43%; natural gas production, by 20%; and crude petroleum production, by 12%. Lignite production decreased by 63%; refined fuels production, by 30%; coke production, by 20%; and cement production, by 17% in 2008 compared with production in 2007 (table 1).

Structure of the Mineral Industry

Mining activities in Albania are regulated by the Mining Law of Albania, No. 7796, dated February 17, 1994. Privatization of Albanian mineral resources is accomplished through the granting of prospecting permits, exploration concessions, and mining concessions to Albanian and foreign companies. As of December 2009, 832 outstanding permits for prospecting, exploration, and mining were reported; 680 of these permits were for mining. Out of the 832 outstanding permits, the largest number were for limestone (282 permits), chromite (262 permits), and iron-nickel and nickel-silicate (37 permits). Table 2 is a list of major mineral industry facilities. Previously listed copper ore and metal production facilities, iron ore mines, and lignite mines were removed from table 2 owing to a lack of information about these facilities (Parliament of Albania, 1994, p. 6-12; National Agency of Natural Resources of Albania, 2010, p. 9).

Commodity Review

Metals

Chromium.—In August, Albanian Chrome, Sh.p.k. (ACR) restarted production at its 1,500-metric-ton-per-month (t/mo)-capacity high-carbon ferrochromium smelter. ACR halted production in December 2008 owing to low demand and falling prices for ferrochromium. Total ferrochromium production capacity increased to 36,000 metric tons per year (t/yr) in October when ACR began production at its new 1,500-t/mo-capacity low-carbon ferrochromium smelter. Also, DCM Decometal obtained the 50% share of ACR that was formerly held by Terwingo Ltd. of Russia. The date and details of the share exchange were unknown (Metal Bulletin, 2009a, p. 9; 2009b, p. 9).

Although the gross weight of chromite output is reported in table 1, figures for marketable chromite ore and concentrate that were reported in the the 2008 Minerals Yearbook were removed owing to a lack of information on production of these products. The National Agency of Natural Resources of Albania reported chromite ore reserves of 36.9 million metric tons (Mt) (National Agency of Natural Resources of Albania, 2010, p. 14).

In January, Empire Mining Corp. received exclusive exploration and development rights to four licenses located near Bulqiza. The area of the licenses covered 64.5 square kilometers (km^2) (24 square miles). JAB Resources Ltd. held three exploration permits that covered 120 km^2 in northeastern Albania. The company's target was to mine 22 Mt of ore containing an average of 14% chromium oxide during the life of the mine; the ore would be processed into concentrate consisting of greater than 40% chromium oxide. The company expected initial production to be about 700,000 t/yr of crude ore and 120,000 t/yr of concentrate. No dates were given for the expected start of production (Empire Mining Corp., 2009; JAB Resources Ltd., 2010).

Industrial Minerals

No data were available on the production of industrial minerals. Production is estimated to have remained near the 2008 production levels.

Cement.—Antea Cement Sh.a. (a subsidiary of Titan Cement Company S.A. of Greece) continued construction of a 1.5-million-metric-ton-per-year (Mt/yr)-capacity cement plant in the Kruje region. The plant was expected to begin operating in March 2010. Cementos Aquila sh.p.k. (a subsidiary of Grupo Empresarial Aricam S.L.) planned to construct a cement plant in Mamurras with an initial capacity of 1.3 Mt/yr and an eventual

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capacity of 2.6 Mt/yr. The company expected the plant to be operational in 2010. The Spacelift Cement Group cement plant was removed from table 2 because it now appears that the plant has not yet been built. The unidentified cement plant located in Vlore that appeared in table 2 in the Albania report of the 2008 Minerals Yearbook has also been removed because the plant seems to have closed in 1994. Two other cement plants in Balldre and in Lezha were also thought to be in the construction stage, but details on these plants were unavailable (Grupo Empresarial Aricam, 2008; Titan Cement Company S.A., 2010, p. 31, 47).

Mineral Fuels

Crude Petroleum.—Crude petroleum production was estimated to have increased by about 5% compared with production in 2008. The increase in production was attributed to an average daily output increase to 6,438 barrels per day (bbl/d) from 5,875 bbl/d in 2008 by Bankers Petroleum Ltd. at the Patos Marinza oilfield in southwestern Albania. Bankers Petroleum also reported an increase of proved reserves at its Patos Marinza license to 92.8 million barrels (Mbbl) from 69.4 Mbbl in 2008. Proved and probable reserves increased to 213.9 Mbbl from 180 Mbbl in 2008 (Bankers Petroleum Ltd., 2010, p. 8). The state-owned company Albpetrol sh.a. was the only other producer of crude oil, but production data were not available for 2009, so production was estimated to have remained at about 1.9 Mbbl.

Outlook

Albania has the potential to increase its production of metals and mineral fuels as exploration projects continue and as foreign companies increase investments in Albania. Further investment will depend on economic and social stability as well as on the improvement of infrastructure.

References Cited

Bankers Petroleum Ltd., 2010, Annual report 2009: Bankers Petroleum Ltd., April 20, 61 p. (Accessed May 12, 2010, at http://bankerspetroleum.com/en/components/investor/2009_ar.pdf.)

Empire Mining Corp., 2009, Empire awarded exploration licenses at its Bulqiza chromite project in Albania: Empire Mining Corp. press release, February 26. (Accessed May 27, 2009, at http://www.empireminingcorp.com/s/NewsReleases.asp?ReportID=339473&_Type=News-Releases&_Title=Empire-Awarded-Exploration-Licenses-at-its-Bulqiza-Chromite-Project-in-Alba....)

Grupo Empresarial Aricam, 2008, Cement: Grupo Empresarial Aricam. (Accessed December 15, 2008, at http://www.aricam.com/aricamenglish/index.html.)

Institute of Statistics of the Republic of Albania, 2010, Gross domestic product by economic activities (1996-2008 at current prices): Institute of Statistics of the Republic of Albania. (Accessed May 11, 2010, at http://www.instat.gov.al/graphics/doc/tabelat/Treguesit Ekonomik/Llogarite Kombetare/LLK2009/tab5.xls.)

International Monetary Fund, 2010, World economic outlook: Washington, DC, International Monetary Fund, April, 159 p.

JAB Resources Ltd., 2010, March 2010 update: JAB Resources Ltd., December, 6 p. (Accessed May 11, 2010, at http://www.jabresources.com/newsletter_assets/NEWSLETTERMAR2010.pdf.).

Metal Bulletin, 2009a, DCM restarts FeCr production in Albania: Metal Bulletin, no. 9111, August 17, 27 p.

Metal Bulletin, 2009b, Non-ferrous metals briefs: Metal Bulletin, no. 9118, October 5, 31 p.

National Agency of Natural Resources of Albania, 2010, Invest in Albanian natural resources—Mineral resources: National Agency of Natural Resources of Albania, April, 28 p.

Parliament of Albania, 1994, Mining law of Albania: Parliament of Albania law no. 7796, February 17, 27 p. (Accessed June 1, 2009, at http://www.akbn.gov.al/files/mining_law.pdf.)

Titan Cement Company S.A., 2010, Annual report and financial results: Titan Cement Company S.A., May 7, 113 p.

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TABLE 1
ALBANIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007	2008	2009 [e]
METALS						
Chromite, gross weight (18-42% Cr_2O_3)		162,772 [r]	212,581 [r]	199,771 [r]	207,104 [r]	256,000 [3]
Copper:						
Ore, gross weight		68,312 [r]	35,071 [r]	98,000 [r]	105,000 [r]	105,000
Cu content or ore (1.3-2.5%)[e]		1,300	670	1,900	2,000 [e]	2,000
Iron and steel:						
Metal, ferroalloys, ferrochromium		34,400	17,040	--	11,916	7,556 [3]
Steel:						
Crude steel, secondary		179,524	205,534	263,271	380,000 [r]	440,000 [3]
Rolled steel		100,000	114,000	136,000	194,000 [r]	226,000
Iron-nickel and nickel-silicate ores[4]		800	79,000	369,559	353,290	350,000
INDUSTRIAL MINERALS						
Cement, hydraulic	thousand metric tons	489	525	889	737	740
Clay, kaolin[e]	do.	310	300	300	300	300
Dolomite[e]		1,000,000 [3]	1,000,000	1,000,000	1,000,000	1,000,000
Gypsum		14,770	19,683	46,200	77,633	78,000
Limestone	cubic meters	1,337,373	1,339,440	1,716,122	3,837,529	3,800,000
Salt[e]		25,000	25,000	25,000	25,000	25,000
Silica sand	cubic meters	3,200	3,200	4,400	12,077	12,000
MINERAL FUELS AND RELATED MATERIALS						
Coal, lignite		2,640 [r]	3,800 [r]	4,000 [r]	1,500 [r]	1,500
Gas, natural, gross production	thousand cubic meters	11,347	11,091	11,089	13,295	13,300
Petroleum:						
Crude, gross weight	thousand 42-gallon barrels	2,301	2,084	3,580 [r,e]	4,000 [r,e]	4,200
Refinery products:						
Bitumen		86,000	83,000	69,000	92,000	92,000
Coke		60,000	64,000	59,000	47,000	47,000
Fuels[e]	thousand 42-gallon barrels	1,820	2,060	2,010	1,400	1,400

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. do. Ditto. -- Zero.

[1]Table includes data available through May 19, 2010.

[2]In addition to the commodities listed, a variety of industrial minerals and construction materials (common clay, lime, olivinite, sand and gravel, and stone) were believed to have been produced, but output is not reported quantitatively, and available information is inadequate to make reliable estimates of output. Also, a small amount of bauxite for use in the cement industry was believed to have been produced.

[3]Reported figure.

[4]Iron-nickel and nickel-silicate ore production were not reported separately. Estimates of metal content of ores were not made owing to the significant variations of the iron and nickel content of the ores, which depend not only on the type of ore, but also on the region in which it was mined. Iron-nickel ores were reported to contain from 37.22% to 44.72% Fe and from 0.97% to 1.07% Ni; nickel-silicate ores were reported to contain from 16.6% to 21.73% Fe and from 1.06% to 1.2% Ni.

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TABLE 2
ALBANIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies	Location of main facilities	Annual capacity[e]
Cement		Fushe Kruje Cement Factory, Sh.p.k. (Seament Holding)	Fushe Kruje, 35 kilometers northwest of Tirana	1,320
Do.		Elbasan Cement Factory (Seament Holding)	Elbasan, 32 kilometers southeast of Tirana	775
Chromite		Albanian Chrome, Sh.p.k. (ACR) (DCM DECOmetal, 100%)	Mine in Bulquize, 40 kilometers northwest of Tirana	85
Do.		do.	Pogradec (including Katjiel and Pojske Mines)	NA
Do.		Numerous small producers	Mostly concentrated near Bulquize	NA
Ferrochromium		Albanian Chrome Sh.p.k. (ACR) (DCM DECOmetal, 100%)	Elbasan, 32 kilometers southeast of Tirana	36
Lime		Kurum International Sh.p.k.	Elbasan	36
Natural gas	million cubic meters	Albpetrol sh.a.	Gasfields in southwest Albania between Ballsh and Fier	NA
Petroleum:				
Crude	42-gallon barrels per day	do.	Oilfields at Marineza, Ballsh, Sheqishte, Patos, Gorrisht, and others	NA
Do.	do.	Bankers Petroleum Ltd.	Oilfields at Kucova and Patos Marinza, east of Fier in south-central Albania	6,500
Refined	do.	Albanian Refining and Marketing Organization Sh.a. (ARMO)	Refineries at Ballsh and Fier	NA
Steel		Kurum International Sh.p.k.	Electric arc furnace plant at Elbasan	600

[e]Estimated. Do., do. Ditto. NA Not available.

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The Mineral Industry of Armenia

By Richard M. Levine

Armenia was a major producer of molybdenum and ranked an estimated seventh in the world in mine output in 2009 (Polyak, 2010). Besides molybdenum, Armenia produced other metals, which included copper, gold, silver, and zinc, and industrial minerals, which included cement, diatomite, gypsum, limestone, and perlite. The country also was producing aluminum foil based on aluminum imported from Russia, and ferromolybdenum, molybdenum metal, and rhenium salt from local ores, and it had developed a diamond-cutting industry based on imported raw materials. The country had almost no domestic fuel production and relied for electric power on a domestic nuclear powerplant and hydroelectric plants. It imported fuel for its nuclear powerplant and natural gas from Russia.

Armenia possesses significant resources of copper, gold, iron, lead, molybdenum, and zinc. It also has resources of construction material, such as basalt, granite, limestone, marble, and tuff; semiprecious stones, such as agate, jasper, and obsidian; and other nonmetallic minerals, such as bentonite, diatomite, perlite, and zeolite. The copper, copper-molybdenum, and copper-polymetallic deposits in the north of Armenia contain about 475 million metric tons (Mt) of ore. The Zangezur copper-molybdenum complex possesses large molybdenum reserves that are concentrated in the K'ajaran deposit. Gold reserves at the Sotk deposit, which was being mined by GeoProMining Ltd., are reportedly 80 metric tons (t) (Interfax Russia & CIS Metals and Mining Weekly, 2007c). The country also possesses uranium reserves, which were reported to range from 10,000 to 60,000 t of uranium. Uranium deposits in Armenia were being explored by the Armenian-Russian Mining Co., which was a joint venture formed in 2008 between the Government of Armenia and the Russian company Atomredzoloto (Avagyan, 2008; Interfax, 2009).

The Armenian economy expanded rapidly from 2001 to 2007. The gross domestic product (GDP) increased at an annual average real growth rate of 13%. In 2008, economic and financial conditions worsened in Armenia owing to, among other things, a decrease in international metals prices, and the GDP growth slowed to 6.8%. In 2009, a construction boom that had driven growth in recent years ended, which resulted in a 14.4% decrease in real GDP for the year, and about 80% of this decrease was caused by the decrease in activity in the construction sector (U.S. Department of State, 2010). The industrial sector, of which mining and metallurgical production was a part, composed about one-third of Armenia's GDP in 2008 (the latest year for which data were available) (U.S. Central Intelligence Agency, 2009).

Minerals in the National Economy

The Armenia Nuclear Power Plant (ANPP) at Metsamor provided about 40% of the electricity generated in the country, and hydroelectric powerplants and thermal powerplants provided about 30% each. Armenia was highly dependent on imported mineral fuels, which came mainly from Russia. Armenia imported most of its natural gas from Russia, which had provided significant discounts to Armenia until 2009. Russia increased the price of gas that Armenia imported to $154 per thousand cubic meters from $110 per thousand cubic meters in April 2009, and further increased it to $180 per thousand cubic meters in April 2010. Nevertheless, the price Russia was charging Armenia was still below the international average price of more than $300 per thousand cubic meters. In the coming years, the price Russia would charge Armenia for gas was expected to converge with the international average market price (U.S. Department of State, 2010).

In May 2009, Iran began shipping gas to Armenia through a recently constructed pipeline; the pipeline was intended to diversify Armenia's gas supply. The majority of gas imported from Iran was expected to be used for power generation. Armenia imported almost all its refined petroleum products through Georgia. The conflict between Russia and Georgia in 2008 resulted in disruptions of fuel imports and highlighted Armenia's vulnerability to using a single transit corridor for its fuel imports (U.S. Department of State, 2010).

Deforestation caused by mining concerns in certain areas of the country had resulted in protests by environmental groups, and aroused controversy concerning Government policies to support investment in the mining sector. Armenia was under strong pressure from the international community to close the aging ANPP at Metsamor by 2016. If it were to close the ANPP, the Armenian Government suggested that it had no alternative but to construct a new nuclear powerplant. The U.S. Agency for International Development (USAID) funded an initial planning study, which was completed in September 2008, and concluded that a new nuclear powerplant was the least-cost option to replacing the existing facility. The Armenian Government was continuing the planning process for constructing a new nuclear powerplant (U.S. Department of State, 2010).

Production

Data on mineral production are in table 1.

Structure of the Mineral Industry

Foreign investors controlled a significant share of Armenia's mineral industry. ARMENAL, which operated a foil mill in K'anak'err, was a subsidiary of United Company RUSAL of Russia. The Zangezur copper-molybdenum complex was privatized at the end of 2004, and was owned by Cronimet Mining GmbH of Germany, 60%; the Open Joint Stock Company (OJSC) Yerevan Pure Iron Works, 15%; and Armenian Molybdenum Production LLC (AMP) and Zangezur Mining LLC (which represented the enterprise's former management), 12.5% each (Interfax Russia & CIS Metals and Mining Weekly, 2007b).

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GeoProMining Ltd., which was a privately owned mineral resources company established in 2001, had assets in Armenia that included the Agarak copper-molybdenum mining and processing complex, the Sotk gold mine, and Ararat gold recovery plant. It bought the Agarak copper-molybdenum mining and processing complex in December 2007 and the Sotk gold mining complex in 2008. GeoProMining produced gold in the form of dore and antimony, copper, and molybdenum concentrates (Interfax Russia & CIS Metals and Mining Weekly, 2010b).

The country's copper smelter at Alavderdi was owned by the CJSC Armenian Copper Programme (ACP). A Liechtenstein-registered firm Valex F.M. Establishment owned 81% of ACP and a Russian businessman owned the remaining 19% (Interfax Russia & CIS Metals and Mining Weekly, 2007a). AMP, which produced ferromolybdenum, molybdenum metal, and rhenium salts, was 51% owned by Cronimet Mining and the remaining shares were owned by Armenian residents (Interfax Russia & CIS Metals and Mining Weekly, 2008). Table 2 is a list of major mineral industry facilities.

Commodity Review

Metals

Aluminum.—The ARMENAL aluminum foil rolling mill was one of the leading production facilities in Armenia and was the only producer of aluminum foil in the Caucasus and Central Asian regions. ARMENAL, together with two Russian foil mills—Sayanal in the Republic of Khakasiya and Urals Foil in the Sverdlovsk region—formed RUSAL's Packaging Division. ARMENAL employed more than 600 people (United Company RUSAL, 2007). In 2009, ARMENAL increased aluminum foil production by 83.57% to 21,456 t from 11,646 t in 2008. Most of ARMENAL's output was exported to the United States. The foil mill had been closed for an overhaul between 2004 and 2006 and it did not achieve its full production capacity of 25,000 metric tons per year (t/yr) of foil until the start of 2009. In 2009, ARMENAL produced 44.1 t of other aluminum products compared with 188.2 t in 2008 (Interfax Russia & CIS Metals and Mining Weekly, 2010c).

Copper and Molybdenum.—The leading producer of copper and molybdenum concentrates was the Zangezur copper-molybdenum complex followed by the Agarak copper-molybdenum mining and processing complex. Copper mining took place at the Kapan mining complex. GeoProMining bought the Agarak copper-molybdenum complex in December 2007. Agarak processed 1.3 Mt of ore in 2009, which was a 5% increase compared with production in 2008. The company said that its growth resulted from an increase in efficiency. In 2009, Agarak produced 248 t of molybdenum concentrate and 13,500 t of copper concentrate. The global economic crisis disrupted operations at the Agarak complex in 2008. The complex suspended operations in February 2009 and did not resume operations until June 30, 2009. In 2010, Agarak planned to mine and process between 3 Mt and 3.5 Mt of ore. It was modernizing its concentrating plant and performing other upgrades to augment throughput capacity and the metal recovery rate (Interfax Russia & CIS Metals and Mining Weekly, 2010b).

In 2009, the country's consolidated copper producer ACP increased blister copper production to 6,858 t, or by 5.8% compared with that of 2008. All copper ACP produced was exported to Europe. ACP produced 35,366 t of copper concentrate, which was a 3.2% increase compared with the 34,258 t it produced in 2008 (Interfax Russia & CIS Metals and Mining Weekly, 2010a).

ACP engaged in exploration, development, production, processing, and marketing of minerals and metals. The company owned the Alaverdi copper smelter, which was the only copper smelting facility in the Caucasus region. Alaverdi was designed to produce up to 10,000 t/yr of blister copper from copper concentrate. The company was also involved in the acquisition, exploration, and development of mining properties in Armenia. ACP was engaged in the development of the Teghout copper-molybdenum deposit. This deposit contains about 450 Mt of ore at an average grade of 0.36% copper and 0.022% molybdenum, totaling more than 1.6 Mt of copper and more than 100,000 t of molybdenum. In the first stage of operation at Teghout, ACP planned to produce about 30,000 t/yr of copper and 1,000 t/yr of molybdenum from processing 7 Mt/yr of ore. The first stage of the project required investment of $280 million. ACP had already invested $30 million in the project. The company had also signed a credit agreement with CJSC VTB Bank (Armenia) for a loan of $245 million (American Chamber of Commerce in Armenia, 2010).

Gold.—Sterlite Gold Ltd. of Canada had held the license to operate the Sotk gold operations until it sold its interest in Sotk to a Russian-backed Georgian Group called Madneuli in early 2007; Madneuli then transferred the license to its subsidiary GeoProMining. GeoProMining was planning to construct a gold processing plant about 10 kilometers (km) from the shores of Lake Sevan, which is one of the world's largest high-altitude freshwater lakes and the sole source for 90% of Armenia's freshwater supplies.

Growing environmental concerns about GeoProMining's plans were prompting opposition to the project. The proposed plant reportedly would include a reservoir for cyanide and toxic chemicals and a dump for cyanide waste; the concern was that these toxins could seep into underground water conduits and enter the 1,200-square-meter lake. Contamination to Lake Sevan could pose a risk to the agricultural industry in the Ararat Valley, which provides about 70% of Armenia's fruits and vegetables and which takes needed irrigation waters from Lake Sevan. According to the chairperson of the Ecolur information center in Yerevan, warnings raised by Ecolur and other concerned social activists led Armenia's Energy and Natural Resources Minister and its Economic Minister to raise concerns about the project. The president of the Lake Sevan Committee also expressed opposition to building the processing plant so close to Lake Sevan. GeoProMining wanted to build the processing plant at its proposed location to reduce transportation costs for ore processing, as ore from Sotk otherwise would have to continue to be transported 263 km south to another GeoProMining processing center in Ararat.

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The Armenian Government had not officially endorsed the project. GeoProMining maintained that it shared the concern for Lake Sevan's environment. The chairman of GeoProMining Gold's (a subsidiary of GeoProMining) Board of Directors stated that the company planned to use mining technologies that would eliminate the risk of environmental damage to Lake Sevan and would refuse to exploit the mine and would stop work there if there was the slightest environmental hazard. The former director of the Sevan National Park, however, argued that the area's landslides and seismic activity would negate any such technologies as no one, he claimed, could guarantee that the toxic waste dump would not be compromised in an earthquake. The smallest crack, he stated, would be enough to have the toxins penetrate into underground water. In addition, fears were raised about potential shelling from neighboring Azerbaijan, which had only a truce arrangement in its war with Armenia (Asbarez Staff, 2009; MAC—Mines and Communities, 2009).

Outlook

Armenia is positioned to increase production of copper and molybdenum; work is being planned to increase the amount of copper and molybdenum ore extracted and to increase the degree to which the metal is processed so the country can export semifinished metal products instead of raw material. Armenia expects to increase its energy supply as it is scheduled to receive additional natural gas from Iran from a pipeline through which gas shipments began in 2009. If Armenia proceeds to develop domestic uranium deposits under exploration by the Armenian-Russian Mining Co., it could be able to supply its entire uranium raw material needs for its nuclear powerplant.

References Cited

American Chamber of Commerce in Armenia, 2010, Armenian copper program: American Chamber of Commerce in Armenia. (Accessed November 26, 2010, at http://www.amcham.am/index.cfm?objectid=4889C3CC-2590-11DE-90590003FF3452C2.)

Avagyan, Armine, 2008, Mining with caution—Syunik Province due to be tapped for uranium: ArmeniaNow.com, May 23. (Accessed August 22, 2010, at http://www.armenianow.com/features/8592/mining_with_caution_syunik_provinc.)

Azbarez Staff, 2009, Environmentalists continue fight to save Lake Sevan from toxic mining venture: Azbarez Armenian News, June 4. (Accessed August 19, 2011, at http://asbarez.com/63791/environmentalists-continue-fight-to-save-lake-sevan-from-toxic-mining-venture/.)

Interfax, 2009, Russian-Armenian uranium JV gets license to explore in Armenia: Russia & CIS Business and Financial Newswire, April 23. (Accessed January 6, 2010, at http://www.highbeam.com/doc/1G1-198426945.html.)

Interfax Russia & CIS Metals and Mining Weekly, 2007a, Armenian copper program reduces blister output 22% in 2006: Interfax Russia & CIS Metals and Mining Weekly, issue 3, January 12-18, p. 18.

Interfax Russia & CIS Metals and Mining Weekly, 2007b, Armenia's Zangezur aims to process 50% more ore in 2008: Interfax Russia & CIS Metals and Mining Weekly, issue 42, November 12-18, p. 16.

Interfax Russia & CIS Metals and Mining Weekly, 2007c, Ararat gold in talks to sell assets in Armenia: Interfax Russia & CIS Metals and Mining Weekly, issue 27, June 29-July 5, p. 14.

Interfax Russia & CIS Metals and Mining Weekly, 2008, Armenia's pure iron raises ferromolybdenum output 10% in 2007: Interfax Russia & CIS Metals and Mining Weekly, v. 17, issue 2, p. 16.

Interfax Russia & CIS Metals and Mining Weekly, 2010a, Armenia's ACP ups blister copper production 5.8% in 2009: Interfax Russia & CIS Metals and Mining Weekly, issue 4, January 29-February 4, p. 15.

Interfax Russia & CIS Metals and Mining Weekly, 2010b, GeoProMining to use $14-mil Armenian govt loan in 2010: Interfax Russia & CIS Metals and Mining Weekly, issue 4, January 29-February 4, p. 14, 15.

Interfax Russia & CIS Metals and Mining Weekly, 2010c, RUSAL ARMENAL almost doubles foil output in 2009: Interfax Russia & CIS Metals and Mining Weekly, issue 4, January 29-February 4, p. 15.

MAC—Mines and Communities, 2009, London calling returns to Armenia—and the Vedanta connection: MAC—Mines and Communities, August 6. (Accessed December 3, 2010, at http://www.minesandcommunities.org/article.php?a=9287.)

Polyak, D.E., 2010, Molybdenum: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 106-107.

United Company RUSAL, 2007, ARMENAL: United Company RUSAL. (Accessed November 9, 2007, at http://www.rusal.com/index.php?lang=eng&subtopic=57&subtopic2=72&subtopic3=95&topic=3.)

U.S. Central Intelligence Agency, 2009, Armenia, *in* The world factbook: U.S. Central Intelligence Agency. (Accessed September 23, 2009, at https://www.cia.gov/library/publications/the-world-factbook/geos/am.html.)

U.S. Department of State, 2010, Armenia: U.S. Department of State background note, November 17. (Accessed November 23, 2010, at http://www.state.gov/r/pa/ei/bgn/5275.htm.)

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TABLE 1

ARMENIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008	2009
METALS						
Aluminum, foil		--	945	12,256	11,646 r	21,456
Copper:						
Concentrate, Cu content e		16,256 [2]	18,000	17,600	18,800	19,000
Blister, smelter, primary		9,881	8,791	6,954	6,480	6,858
Ferroalloys:						
Ferromolybdenum		2,260	4,865	5,977	5,323	5,144
Ferrotungsten		8	42	45	45 e	40
Gold, mine output, Au content	kilograms	1,400	1,400	1,400 e	1,400 e	1,400 e
Molybdenum:						
Concentrate, Mo content		3,000 e	3,900	4,080	4,250	4,100
Metal		270	487	500	520	500
Rhenium e	kilograms	1,200	1,200	1,200	1,200	1,200
Silver e	do.	4,000	4,000	4,000	4,000	4,000
Zinc, concentrate, Zn content		3,196	4,454	4,924	4,200 e	3,400
INDUSTRIAL MINERALS						
Barite e		590 [2]	600	600	600	500
Caustic soda		6,200	4,166	5,484	4,476	4,000
Cement	thousand metric tons	605	625	722	770	467
Clays:						
Bentonite		38,000	37,000	40,000	40,000	38,000
Bentonite, powder		732	720	1,129	1,100 e	1,000
Diamond, cut	thousand carats	222	184	123	120 e	80
Diatomite		190	180	200	200 e	180
Gypsum		44,200	43,700	54,600	45,900	40,000
Limestone	thousand metric tons	17,000	17,000 e	18,000	18,000 e	15,000
Perlite e		49,963 [2]	35,000	35,000	35,000	35,000
Salt		34,682	37,000	34,800	37,300	35,000
MINERAL FUELS AND RELATED MATERIALS						
Natural gas, dry	million cubic meters	NA	1,596	2,285	3,000 e	3,000

eEstimated; estimated data are rounded to no more than three significant digits. rRevised. do. Ditto. -- Zero.

[1]Table includes data available through December 7, 2010.

[2]Reported figure.

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TABLE 2

ARMENIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1, 2]

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity[e]
Aluminum, rolled and foil	ARMENAL (formerly Kanaker aluminum plant) (United Company RUSAL)	K'anak'err	25,000
Cement	Aarattsement Group (Multi Group)	Ararat region	NA
Do. thousand metric tons	Mika-Cement	Hrazdan	1,200
Copper:			
Mine output, Cu content	Facilities in operation:		30,000 [3]
	Agarak copper-molybdenum mining and processing complex [Comsup Commodities, Inc. (United States)]	Agarak	
	Kapan mining complex [Deno Gold Mining Co. (Switzerland)]	Kapan	
	Zangezur copper-molybdenum complex [Cronimet Mining GmbH (Germany), 60%; OJSC Yerevan Pure Iron Works, 15%; Armenian Molybdenum Production LLC (AMP), 12.5%; Zangezur Mining LLC, 12.5%] mining Kadzharan deposit	Kadzharan K'ajan	
	Facilities not in operation:		
	Akht'ala mining complex	Akht'ala	
	Shamlugh mining complex	Shamlugh	
Blister	CJSC Armenian Copper Programme (ACP) (Valex F.M. Establishment, 81%, and Russian businessman, 19%)	Alaverdi	15,000
Diamond, cut stones	Aghavni diamond-cutting works[4]	Nor Geghi	NA
Do.	Amma group diamond-cutting works[4]	Artashat	NA
Do.	Andranik-Dashk diamond-cutting works	Nor Hachyn	NA
Do.	Arevakn diamond producing plant	do.	NA
Do.	Diamond Company of Armenia (DCA)	Yerevan	NA
Do.	Diamond Tech	Talin	NA
Do.	Lori diamond-cutting works	Nor Hachyn	NA
Do.	Lusampor[4]	Melik'gyugh	NA
Do.	Punji diamond-cutting works[4]	Yerevan	NA
Do.	Sapphire diamond-cutting works	Nor Hachyn	NA
Do. thousand carats	Shoghakan gem-cutting plant	do.	120
Gold kilograms	Zod mining complex	Zod	2,000
Do.	Megradzor deposit	Meghradzor	NA
Do.	Lichkvazkoye, Shaumyanskiy Rayon, Sotkskoye, and Terterasarskoye deposits	NA	NA
Iron ore	Hrazdan deposit	Hrazdan region	NA
Molybdenum:			
Mine output, Mo content	Agarak copper-molybdenum mining and processing complex [Comsup Commodities, Inc. (United States)]	Agarak	2,000
Do.	Zangezur copper-molybdenum complex [Cronimet Mining GmbH (Germany), 60%; OJSC Yerevan Pure Iron Works, 15%; Armenian Molybdenum Production LLC (AMP), 12.5%; Zangezur Mining LLC, 12.5%] mining Kadzharan deposit	Kadzharan K'ajan	20,400
Metal, ferromolybdenum	Armenian Molybdenum Production LLC (AMP) [Cronimet Mining GmbH (Germany), 51%, and Armenian residents, 49%]	NA	3,600
Do.	OJSC Yerevan Pure Iron Works	Yerevan	NA
Perlite thousand metric tons	Aragats-Perlite mining-beneficiation complex	Aragats deposit	1,110
Zinc, mine output, Zn content	Kapan mining complex [Deno Gold Mining Co. (Switzerland)]	Kapan	NA

See footnotes at end of table.

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TABLE 2—Continued

ARMENIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1, 2]

[e]Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

[1]Table includes data available through December 7, 2010.

[2]Many location names have changed since the breakup of the Soviet Union. Many enterprises, however, are still named or commonly referred to based on the former location name, which accounts for discrepancies in the names of enterprises and that of locations.

[3]Capacity estimate is the total for all enterprises that produce this commodity.

[4]Current existence of enterprise cannot be confirmed.

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THE MINERAL INDUSTRY OF AUSTRIA

By Steven T. Anderson

During 2009, the Erzberg open pit iron ore mine at Eisenerz in the State of Styria and the underground tungsten mine at Mittersill in the State of Salzburg were the only metal mines still in operation in Austria. This was not the case with the industrial minerals sector, however, which produced a number of minerals, including dolomite, gypsum, kaolin, lime, limestone, magnesite, marble, salt, silica (quartz) sand, and talc. Excluding production (if any) in the United States[1] in 2009, Austria was estimated to have been the fourth ranked producer of tungsten in the world and the fifth ranked producer of magnesite and to have accounted for 1.7% and 4%, respectively, of the world's production. The country also accounted for about 1% of the world's production of natural gypsum in 2009 (including production by the United States) (Crangle, 2010; Kramer, 2010; Shedd, 2010).

Minerals in the National Economy

In 2008 (the latest year for which data were available), the value of production by the mineral extractive sector (including that of mine output and production of crude petroleum and natural gas) in Austria accounted for about 0.5% ($2 billion[2]) of the country's gross domestic product (GDP), and there were about 11,600 employees in the sector. Employees in the sector earned about $3,500 per month, on average, in 2008, which was about 30% higher than the average monthly wage across all sectors of the Austrian economy. According to preliminary data from indices of the value of production with a base year of 2005, the real value of mine output and production of crude petroleum and natural gas in Austria decreased by about 8% in 2009 compared with that of 2008, although this decrease was of a lesser magnitude than the 10% decrease in the real value of all industrial production in the country during the same timeframe. Investment in the ferrous metals sector increased to $763 million in 2009 from $762 million in 2008, that in the stones and ceramics sector decreased to $248 million from $268 million in 2008, that in the nonferrous metals sector decreased to $56 million from $181 million in 2008, and that in the mining sector decreased to $47 million from $54 million in 2008 (Bundesministerium für Wirtschaft, Familie und Jugend, 2009, p. 11-12; Bundeskammer für Arbeiter und Angestellte, 2010, p. 88, 261, 299, 315; International Monetary Fund, 2010).

An exact mineral trade balance or the detailed data to calculate one accurately were not available. More-aggregated data, however, indicated that the value of Austria's exports of raw materials (including nonfuel minerals) decreased to $4.1 billion in 2009 from $5.4 billion in 2008, and the value of the country's imports of raw materials decreased to about $5.4 billion from $7.8 billion. Also, the value of total exports of fuels and energy (including mineral fuels) decreased to $4.5 billion in 2009 from about $6 billion in 2008, and that of imports of fuels and energy decreased to 14.2 billion from $21.1 billion. Thus, Austria's trade balance for energy, fuels, and raw materials (probably including most if not all of the mineral trade balance as a subset) was about –$11 billion in 2009 compared with –$17.5 billion in 2008 (Bundeskammer für Arbeiter und Angestellte, 2010, p. 331-332; International Monetary Fund, 2010).

Government Policies and Programs

The basis of Austria's mining law is the Mineralrohstoffgesetz (MinroG) (Federal Law BGBl. I. no. 38/1999), or "Mineral Resources Law," which came into effect on January 1, 1999, in replacement of the country's previous mining law (BGBl. 259/1975) that had been in effect since April 11, 1975. Through 2009, the MinroG had been amended by Federal Laws BGBl. I no. 21/2002, BGBl. I no. 112/2003, BGBl. I no. 85/2005, BGBl. I no. 84/2006, BGBl. I no. 113/2006, and BGBl. I no. 115/2009; and by the publication BGBl. I no. 83/2003. The MinroG applies to the exploration for, production of, and processing of minerals in the country; the use of workings of unused mines; and the exploration for, locating of, and evaluation of the suitability of such geologic structures as caverns for holding or storing substances, such as liquid and gaseous mineral fuels. Three environmental laws that were directly applicable to mining and other mineral production and processing operations in the country were the Remediation Act of 1989 (BGBl. no. 299/1989), as last amended in 2008 by BGBl. I no. 40/2008; the Environmental Information Act of 1993 (BGBl. no. 495/1993), as last amended in 2005 by BGBl. I no. 6/2005; and the Environmental Impact Assessment Act of 2000 (BGBl. No. 697/1993), as last amended in 2006 by BGBl. I no. 149/2006 (Bundesministerium für Wirtschaft, Familie und Jugend, 2009, p. 22-28; undated; Rohöl-Aufsuchungs Aktiengesellschaft, undated).

As a member of the European Union (EU), Austria participates in developing minerals security and energy strategies for the EU, and the country's own policies in this realm are affected by the policies and measures adopted by the EU. On November 4, 2008, the European Commission (EC) adopted a new raw materials initiative that included measures to secure and improve access to minerals for the EU. This initiative was expected to result in the adoption of a new raw materials (minerals) strategy for the EU, which would be based upon the following three main objectives:

- Ensure EU access to raw materials from international markets under the same conditions as other industrial competitors
- Set the right framework conditions within the EU to foster a sustainable supply of raw materials from European sources
- Boost overall resource efficiency and promote recycling to reduce the EU's consumption of primary raw materials and decrease the EU's relative import dependence.

[1]U.S. data were withheld to avoid disclosing company proprietary data.

[2]Where necessary, values have been converted from European Union euros (€) to U.S. dollars (US$) at an annual average exchange rate of €0.6795=US$1.00 for 2008 and €0.718=US$1.00 for 2009. All values are nominal, at current prices, unless otherwise stated.

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The EC expected to finalize a raw materials strategy for the EU by sometime in 2011. In May 2009, the EC formed a working group to better define the critical minerals for the EU and another to exchange information on best practices for land use planning, permitting, and geological knowledge sharing between EU members. The Austrian Government participated in both of these working groups, and the EC cited the Austrian mineral resources plan (development of which was begun in 2001) as an example of best practices in the area of land use planning (Commission of the European Communities, 2008; Bundesministerium für Wirtschaft, Familie und Jugend, 2009, p. 1-10).

On June 25, 2009, Directive 2009/29/EC of the European Parliament and of the Council (of April 23, 2009) entered into force to amend Directive 2003/87/EC [which established the greenhouse gas emission allowance trading scheme (ETS) for the EU], with the main goals of improving the ETS and extending it beyond 2012. In March 2007, the EU Heads of State and Government set a series of climate and energy targets to be met by 2020, including the following three:

- A reduction in EU greenhouse gas (GHG) emissions of at least 20% below 1990 levels
- A minimum 20% of EU energy consumption coming from renewable resources
- A 20% reduction in primary energy use compared with projected levels, to be achieved by improving energy efficiency.

In April 2009, the ministers of two Austrian Federal Government ministries convened a working group to develop measures as part of a new Austrian energy strategy that would enable the country to develop a sustainable energy system that could make energy services available for private consumption as well as for businesses in the future, while still implementing EU rules. The core objectives of the new Austrian energy strategy were as follows:

- *Energy efficiency*—An improvement in energy efficiency at all stages of the provision and use of energy
- *Renewable energy*—A focus on hydropower (including pump storage), wind power, and biomass and photovoltaic sources of power
- *Security of supply*—To be increased and aimed at the highest possible degree of cost effectiveness.

The working group also suggested that Austria's targets for 2020 should be that 34% of Austrian energy consumption comes from renewable resources, and that GHG emissions are reduced by 16% below 1990 levels in sectors that do not participate in the EU's ETS.

In order for the demand for energy services in Austria to be met in a way that is compatible with the EU climate and energy targets for 2020, the Austrian working group recommended that the new Austrian energy strategy set the target for total energy consumption in Austria in 2020 to be no more than 1,100 petajoules (European Parliament and Council, 2009, p. 63-68, 71-74; Bundesministerium für Wirtschaft, Familie und Jugend, 2010; European Commission, 2010).

Production

Data on Austria's mineral production are in table 1. At the time of this writing, reported figures concerning the country's mineral production during 2009 were mostly unavailable. According to preliminary data from the International Copper Study Group, Austria's production of secondary refined copper decreased by approximately 10% compared with that of 2008. According to data from the World Steel Association, the country's production of pig iron and crude steel decreased by about 22% and 25%, respectively, compared with that of 2008. These decreases in production were far greater than the global average decreases in production of about 3% and 7.5%, respectively, but less than the average decreases of about 30% and 33%, respectively, for the 27 member countries of the EU. Austria's production of iron ore was estimated to have decreased in about the same proportion as the production of crude steel because by far the leading producer of crude steel in the country (Voestalpine AG) consistently appeared to include the same percentage of domestically produced iron ore in the volume of raw material used by the company to manufacture crude steel in the country. Austria's production of iron ore could have decreased proportionally less than the country's production of crude steel if Austria exported more iron ore than in 2008, but this is unlikely given the even greater decrease, on average, in the production of crude steel (and demand for iron ore) in the rest of the EU (table 1; International Copper Study Group, 2010, p. 15; Schneeweiss, 2010; World Steel Association, 2010, p. 7, 10-11, 18, 21).

Vereinigung der Österreichischen Zementindustrie estimated that production of cement in the country decreased by about 13% in 2009 compared with that of 2008. The decrease was primarily in response to a decrease in demand from Austria's construction sector, particularly for use in housing and infrastructure construction. Production of most of the industrial minerals listed in table 1 was estimated to have decreased to a greater or lesser extent than that of cement, depending on what were the expected effects of the economic downturn on the demand for different minerals by the sectors of the Austrian and the EU economy that were the primary buyers of each of these minerals (table 1; Vereinigung der Österreichischen Zementindustrie, 2010).

Structure of the Mineral Industry

Table 2 is a list of major mineral industry facilities in Austria, and this table has been updated to include the major owners and capacity information for those facilities that accounted for almost all of Austria's production of the minerals for which the country accounted for greater than 1% of global production in 2009 (including magnesite). Many mineral producers and processors (including most of the producers of industrial minerals in Austria) are not listed in table 2 owing to a lack of availability of information concerning the production capacities of the many small- and medium-scale ("Mittelstand") family-owned companies that produce minerals in the country. In 2008 (the latest year for which data were available), there were reportedly 1,139 operations that produced and processed

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minerals in the country, including 633 mining and quarrying operations and 3 operations that produced natural gas and (or) crude petroleum. Of the mining operations in Austria, 630 produced industrial minerals, including 614 open pit mines or quarries, 11 underground (nonsalt) industrial mineral mines, and 5 underground salt mines (Bundesministerium für Wirtschaft, Familie und Jugend, 2009, p. 11-14, 154-159; Wilson, 2010).

On February 17, 2009, Sandvik AB of Sweden reached an agreement to acquire Wolfram Bergbau- und Hütten- GmbH Nfg. KG (WBH), which operated the Mittersill tungsten mine and the facilities to produce primary and secondary tungsten products in Austria, and Sandvik completed the acquisition on May 28. On July 1, the Austrian construction materials (including aggregates) company STRABAG SE withdrew from a purchase contract to acquire all the operations of CEMEX, S.A.B. de C.V. of Mexico in both Austria and Hungary after Austrian antitrust authorities did not approve the acquisition by a deadline of June 30, 2009. Rigips Austria GmbH was acquired by Compagnie de Saint-Gobain of France, and the name of the company was changed to Saint-Gobain Rigips Austria GmbH (Compagnie de Saint-Gobain, 2010, p. 199, 234; Saint-Gobain Rigips Austria GmbH, 2010; Sandvik AB, 2010, p. 7, 17, 82; STRABAG SE, 2010, p. 97, 154).

Outlook

Occasional market shortages of magnesite and continuing higher prices for dead-burned magnesia are expected in 2010 and beyond, apparently owing to export taxes, quotas, and a licensing system being implemented in China to limit exports. Exploration for new sources of magnesite appear to be increasing, but information concerning whether any of that exploration effort is being expended in Austria was not available. Austria is estimated to have accounted for about 4% of the world production of magnesite in both 2008 and 2009, and appeared to be producing close to capacity in 2008. Because information concerning expansions of magnesite production capacity in 2009, 2010, or beyond was not available, it is not apparent whether producers of magnesite and magnesia in the country could increase production much above their 2008 production levels. As the price of iron ore began to increase in 2010, Voestalpine was considering increasing the proportion of domestic iron ore it uses in the company's production of crude steel (relative to the proportion of imported iron ore it used in 2009). If so, then production of iron ore in Austria is expected to increase in 2010 compared with that of 2009, and production of iron ore in the country could remain higher if Austria's steel production increases and a higher proportion of domestic iron ore continues to be demanded. Voestalpine warned that the upward trends in demand for steel and production of crude steel are likely to remain highly uncertain, however. Austria's demand for cement and production of cement are not expected to increase much in 2010 compared with that of 2009 because the number of housing construction projects, infrastructure projects, and other construction projects is not expected to increase significantly until sometime in 2011, at the earliest (Groendahl, 2010; Kramer, 2010; Schneeweiss, 2010; Vereinigung der Österreichischen Zementindustrie, 2010; Wilson, 2010).

References Cited

Bundeskammer für Arbeiter und Angestellte, 2010, Wirtschafts- und sozialstatistische Taschenbuch 2010: Vienna, Austria, Bundeskammer für Arbeiter und Angestellte, 575 p.

Bundesministerium für Wirtschaft, Familie und Jugend, 2009, Österreichisches montan-handbuch 2009: Vienna, Austria, Bundesministerium für Wirtschaft, Familie und Jugend, August 31, 335 p.

Bundesministerium für Wirtschaft, Familie und Jugend, 2010, Energy strategy Austria: Vienna, Austria, Bundesministerium für Wirtschaft, Familie und Jugend, March, 6 p.

Bundesministerium für Wirtschaft, Familie und Jugend, [undated], Rechtsgrundlagen Bergbau—Mineralrohstoffgesetz: Vienna, Austria, Bundesministerium für Wirtschaft, Familie und Jugend. (Accessed January 25, 2010, at http://www.bmwfj.gv.at/ENERGIEUNDBERGBAU/RECHTSGRUNDLAGENBERGBAU/Seiten/default.aspx.)

Commission of the European Communities, 2008, The raw materials initiative—Meeting our critical needs for growth and jobs in Europe: Brussels, Belgium, Commission of the European Communities, communication from the commission to the European Parliament and the council, COM(2008) 699, Doc. 16053/08, November 4, 13 p.

Compagnie de Saint-Gobain, 2010, Annual report 2009: Courbevoie, France, Compagnie de Saint-Gobain, March 31, 248 p.

Crangle, R.D., Jr., 2010, Gypsum: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 70-71.

European Commission, 2010, The EU climate and energy package: European Commission, October 18. (Accessed March 10, 2011, at http://ec.europa.eu/clima/policies/brief/eu/package_en.htm.)

European Parliament and Council, 2009, Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community: Luxembourg, Official Journal of the European Union, L 140, June 5, p. 63-87.

Groendahl, Boris, 2010, Voestalpine warns upswing may be short-lived: London, United Kingdom, Thomson Reuters Plc, Metals Insider, June 1, p. 9.

International Copper Study Group, 2010, Table 5—World copper refinery production: Copper Bulletin, v. 17, no. 5, May, p. 15-17.

International Monetary Fund, 2010, Austria, *in* World economic outlook database: International Monetary Fund, October. (Accessed January 1, 2011, via http://www.imf.org/external/pubs/ft/weo/2010/02/weodata/index.aspx.)

Kramer, D.A., 2010, Magnesium compounds: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 94-95.

Rohöl-Aufsuchungs Aktiengesellschaft, [undated], History: Rohöl-Aufsuchungs Aktiengesellschaft. (Accessed March 3, 2011, at http://www.rag-austria.at/en/company/portrait/history.html.)

Saint-Gobain Rigips Austria GmbH, 2010, Unternehmensgeschichte: Saint-Gobain Rigips Austria GmbH. (Accessed March 3, 2011, at http://www.rigips.at/unternehmen/geschichte-des-unternehmens.html.)

Sandvik AB, 2010, Annual report 2009: Sandviken, Sweden, Sandvik AB, February 18, 112 p.

Schneeweiss, Zoe, 2010, Voestalpine may raise iron ore output as price surges—Update 2: Bloomberg L.P., April 9. (Accessed April 9, 2010, at http://www.businessweek.com/news/2010-04-09/voestalpine-may-raise-iron-ore-output-as-price-surges-update1-.html.)

Shedd, K.B., 2010, Tungsten: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 176-177.

STRABAG SE, 2010, Annual report 2009: Villach, Austria, STRABAG SE, April 7, 199 p.

Vereinigung der Österreichischen Zementindustrie, 2010, Österreichs zementindustrie—Jahresbilanz 2009 und ausblick: Vienna, Austria, Vereinigung der Österreichischen Zementindustrie, May 18, 4 p.

Wilson, Ian, 2010, The world of magnesite: Industrial Minerals, no. 512, May, p. 50-69.

World Steel Association, 2010, World steel in figures 2010: Brussels, Belgium, World Steel Association, July 13, 26 p.

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TABLE I
AUSTRIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Thousand metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008	2009[e]
METALS						
Aluminum, metal, secondary[e]	metric tons	150,000	150,000	150,000	150,000	100,000
Copper, metal, secondary:						
Smelter	do.	52,700	65,900	80,200	94,200	90,800 [p, 2]
Refined	do.	72,316	72,600	81,400	106,700	96,200 [p, 2]
Iron and steel:						
Iron ore:						
Gross weight		2,048	2,093	2,153	2,033	1,500
Fe content		665	669	689	650	480
Metal:						
Pig iron		5,444	5,547	5,808	5,815 [r]	4,562 [2]
Ferroalloys, electric arc furnace, gross weight[e]		14	14	14	14	10
Crude steel		7,031	7,129	7,578	7,594	5,662 [2]
Semimanufactures, hot-rolled products		6,164	6,495	6,816	6,850 [e]	5,000
Lead, refined, secondary	metric tons	24,357	28,120	28,564	26,902	20,000
Manganese, Mn content of domestic iron ore[e]	do.	16,000	16,000	15,000	15,000	10,000
Tungsten ore and concentrate:						
Ore:						
Gross weight	do.	472,964	400,182	435,006	434,296	350,000
W content[e]	do.	1,550	1,310	1,270	1,250	1,000
Concentrate, W content	do.	1,280	1,153	1,117	1,122	900
INDUSTRIAL MINERALS						
Cement:						
Clinker		3,221	3,654	3,992	4,004	3,600
Hydraulic		4,560	4,852	5,203	5,309	4,600
Clays:						
Kaolin, crude		56	52	57	50	40
Common, including brick clay and illite		2,410	2,868	2,362	2,371	2,100
Diabase (of basaltic rocks)		1,230	1,885	2,242	2,280	2,000
Graphite, crude	metric tons	--	--	--	250	250
Gypsum and anhydrite, crude:						
Gypsum		911	936	1,006	1,023	900
Anhydrite		106	135	57	64	50
Lime, including quicklime		465 [e]	473	497	909	500
Of which, marketed		460	465	491	612	450
Magnesite:						
Crude		694	769	812	837	750
Sintered or dead burned		304	270	288	290	250
Caustic calcined		98	98	51	50	40
Nitrogen, N content of ammonia[e]		400	400	400	400	300
Pigments, mineral, micaceous iron oxide[e]	metric tons	5,000	5,000	5,000	5,000	4,000
Pumice (trass), crude	do.	2,943	--	--	--	--
Salt (NaCl):						
Brines, gross	thousand cubic meters	3,409	3,451	3,195	3,778	3,500
Evaporated, mechanical heating process	metric tons	769,955	764,189	726,430	866,674	750,000
Rock	do.	1,497	1,446	1,172	503	500
Mine output, NaCl content		1,024	807	742	1,134	1,000
Sand and gravel:						
Quartz (silica) sand		1,610	2,008	1,890	2,150	1,900
Sand and gravel, unspecified		6,003	18,995	21,391	27,315	25,000
Total		7,613	21,003	23,281	29,465	27,000
Sodium compounds, manufactured, n.e.s.:[e, 3]						
Soda ash		100	100	100	100	100
Sulfate		100	100	100	100	100

See footnotes at end of table.

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TABLE 1—Continued
AUSTRIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Thousand metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008	2009[e]
INDUSTRIAL MINERALS—Continued						
Stone:						
Amphibolite		197	667	754	825	700
Basalt, not included in diabase		3,166	1,947	1,902	1,795	1,500
Dolomite		6,291	3,411	4,296	4,435	4,000
Gneiss		42	513	902	1,089	900
Granite and granulite		788	2,503	1,858	3,055	2,500
Limestone, marble, and serpentine		25,342	23,192	23,462	24,620	23,000
Marl		1,479	2,062	2,115	1,826	1,500
Quartz, quartzite, and pegmatite		249	290	306	322	250
Other, including conglomerate		--	14	80	99	50
Total		37,554	34,599	35,675	38,066	34,400
Sulfur, byproduct of petroleum and natural gas	metric tons	8,458	10,166	10,786	8,016	8,000
Talc and leucophyllite (white mica), crude	do.	166,569	159,447	153,409	154,577	150,000
MINERAL FUELS AND RELATED MATERIALS						
Coal, brown and lignite		14	8	--	--	--
Coke		1,388	1,283	1,422	1,410	1,300
Natural gas:						
Marketable (net)	million cubic meters	1,654	1,765	1,835	1,544	1,500
Natural gas liquids	thousand 42-gallon barrels	814	919	868	836	830
Oil shale	metric tons	--	287	4	114	100
Petroleum:						
Crude[4]	thousand 42-gallon barrels	6,018	6,028	6,009	6,066	6,000
Refinery products:						
Liquefied petroleum gas	do.	1,241	587	813	1,134[5]	1,100
Gasoline	do.	15,283	13,719	14,467	14,400[5]	14,000
Kerosene and jet fuel	do.	4,596	4,084	4,688	3,660[5]	3,500
Distillate fuel oil	do.	7,796	6,828	5,755	5,280[5]	5,200
Residual fuel oil	do.	6,141	6,687	4,052	6,600[5]	6,000
Unspecified	do.	31,654	31,787	34,454	34,500[5]	34,000
Refinery fuel and losses	do.	4,627	243	173	154[5]	150
Total	do.	71,338	63,935	64,402	65,728	64,000

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [p]Preliminary. [r]Revised. do. Ditto. -- Zero.

[1]Table includes data available through August 27, 2010.

[2]Reported figure.

[3]Not elsewhere specified.

[4]All figures were converted to barrels from metric tons according to a converson factor of 7.040 barrels of crude oil per metric ton. Source: U.S. Energy Information Administration, [undated], International Energy Statistics—Austria: Washington, D.C., U.S. Energy Information Administration. (Accessed March 7, 2010, at http://tonto.eia.doe.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=94&pid=57&aid=32.)

[5]Figure converted to barrels from metric tons according to a converson factor and reflects the significant digits of the conversion factor.

Source: U.S. Energy Information Administration, 2008, International Energy Annual—Table C.1, General Conversion Factors: Washington, D.C., U.S. Energy Information Administration. June-December. (Accessed March 7, 2010, at http://www.eia.doe.gov/emeu/iea/tablec1.html.)

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TABLE 2
AUSTRIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Alumina, fused	Treibacher Schleifmittel AG	Plant at Villach, State of Carinthia	100.
Aluminum	Aluminum Lend GmbH (Salzburger Aluminium AG, 100%)	Secondary ingot plant at Lend, State of Salzburg	40.
Do.	Austria Metall GmbH (AMAG)	Secondary ingot plant at Ranshofen, State of Upper Austria	50.
Cement	Lafarge Perlmooser AG (Lafarge S.A., 100%)	Plant at Mannersdorf, State of Lower Austria; plant at Retznei, State of Styria; grinding plant at Kirchbichl, State of Tirole	2,200.
Do.	Wietersdorfer & Peggauer Zementwerke GmbH	Plant at Peggau, State of Styria; Plant at Wietersdorf, State of Carinthia	900.
Do.	Gmundner Zement Produktions- und Handels GmbH	Plant at Gmundnen, State of Upper Austria	800.
Do.	Kirchdorfer Zementwerk Hofmann GmbH	Plant at Kirchdorf, State of Upper Austria	800.
Do.	Zementwerk LEUBE GmbH	Plant at Gartenau, State of Salzburg	770.
Do.	Wopfinger Baustoffindustrie GmbH	Plant at Wopfing, State of Lower Austria	300.
Clays, kaolin, and silica sand	Österreichische Kaolin- und Montanindustrie AG	Mines at Weinzierl and Kriechbaum; processing plant at Aisthofen, State of Upper Austria	170.
Coal	Graz-Koflacher Eisenbahn und Bergbaugesellschaft GmbH (Government, 100%)	Oberdorf Mine, Bärnbach, State of Styria (closed)	1,200.
Copper, secondary	Montanwerke Brixlegg AG (A-Tec Industries AG, 100%)	Plant at Brixlegg, State of Tirole	75 cathode, 66 billet.
Ferroalloys, FeV, FeMo, FeNi	Treibacher Industrie AG	Plant at Althofen, State of Styria	10.
Graphite, natural	Graphitbergbau Mühldorf Mörth GmbH	Trandorf Mine at Weinberg and extended to Weinbergwald, State of Lower Austria; mine at Eichenwald, State of Styria	15.
Do.	Grafitbergbau Kaisersberg GmbH	Kaisersberg Mine, State of Tirole	3.
Gypsum and anhydrite, natural	Moldan Baustoffe GmbH & Co. KG (CONNEXIO Alternative Investment & Holding AG, 100%)	Abtenau and Moosegg Mines, near Kuchl bei Hallein, State of Salzburg	300.
Do.	Saint-Gobain Rigips Austria GmbH (Compagnie de Saint-Gobain, 100%)	Mine at Grundlsee and main plant at Bad Aussee, State of Styria; Mine and plant at Puchberg, State of Lower Austria	250.
Do.	Knauf GmbH	Hinterstein Mine, Spital am Pyhrn, State of Upper Austria; Mines at Dörfelstein and Tragöß-Oberort, and plant at Weißenbach bei Liezen, State of Styria	160.
Do.	Gipswerk Schretter & Cie. GmbH	Mine at Weißenbach am Lech and plant at Vils, State of Tirole	NA.
Iron ore	VA Erzberg GmbH (Voestalpine AG, 100%)	Erzberg Mine at Eisenerz, State of Styria	3,000.
Iron oxide, micaceous	Kärntner Montanindustrie GmbH	Mine near Waldenstein, State of Carinthia	
Lead	Bleiberg Bergwerks-Union AG (Metall Gesellschaft, 74%)	Smelter at Brixlegg, State of Tirole	55.
Magnesite	Veitsch-Radex GmbH & Co. (RHI AG, 100%)	Mine and plant at Breitenau, State of Styria; Mine at Eichberg, State of Lower Austria; Am Bürgl Mine, area near Weissenstein, State of Tirole; mine and processing plant at Millstätteralpe, State of Carinthia	800.
Do.	Styromagnesit Steirische Magnesitindustrie GmbH	Angerer, Kaintaleck and Wieser Mines, and plant near Oberdorf an der Laming, State of Styria; Wald Mine in the Schoberpass, State of Styria	35.
Do.	CEMEX Austria AG (CEMEX S.A. de C.V., 100%)	Mine and plant at Veitsch, State of Styria	NA.
Do.	PRONAT Steinbruch Preg GmbH (Schotter- und Betonwerk Karl Schwarzl Betriebsgesellschaft m.b.H., 100%)	Magnesite and dunite (olivine rock) mine at Gulsen, and plant at Preg, State of Styria	NA.

See footnotes at end of table.

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TABLE 2—Continued
AUSTRIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Natural gas million cubic meters	OMV Austria Exploration & Production GmbH [OMV Aktiengesellschaft (Free floating shares, 48.5%; Government, 31.5%; International Petroleum Investment Co. 20%), 100%]	Main fields in the Vienna Basin, State of Lower Austria, and some fields in the State of Upper Austria	1,500.
Do. do.	Rohöl-Aufsuchungs Aktiengesellschaft (EVN AG, 50.025%; E.ON Ruhrgas E&P GmbH, 29.975%; Steirische Gas-Wärme GmbH, 10%; Salzburg AG, 10%)	Main fields in the State of Upper Austria, and some fields in the State of Lower Austria and the State of Salzburg	550.[e]
Nitrogen, N content of ammonia	Agrolinz AG	Plant at Linz, State of Upper Austria	498.
Oil shale	Tiroler Steinölwerke Albrecht GmbH & Co. KG	Mine in the Bächental, near Pertisau am Achensee, State of Tirole	NA.
Petroleum, crude thousand 42-gallon barrels	OMV Austria Exploration & Production GmbH [OMV Aktiengesellschaft (Free floating shares, 48.5%; Government, 31.5%; International Petroleum Investment Co., 20%), 100%]	Main fields in the Vienna Basin, State of Lower Austria, and some fields in the State of Upper Austria	5,500.[e]
Do. do.	Rohöl-Aufsuchungs Aktiengesellschaft (EVN AG, 50.025%; E.ON Ruhrgas E&P GmbH, 29.975%; Steirische Gas-Wärme GmbH, 10%; Salzburg AG, 10%)	Main fields in the State of Upper Austria, and some fields in the State of Lower Austria and the State of Salzburg	750.[e]
Salt, NaCl content	Salinen Austria AG	Mines at Bad Ischl and Hallstatt, and evaporite saltworks at the Ebensee, State of Upper Austria; mine at Hallein-Dürrnberg, State of Salzburg; mine at Hall in Tirol, State of Tirole; mine at Altaussee, State of Styria	1,100.
Silica sand	Krempelbauer-Quarzsandwerk St. Georgen Hentschläger & Co. KG.	Burger and Knoll-Wizany Mines at Luftenberg, Krempelbauer and Poscher Mines at St. Georgen, and Treffling Mine at Aigen-Engerwitzdorf, State of Upper Austria	NA.
Do.	Quarzwerke Österreich GmbH (Quarzwerke GmbH, 100%)	Mine and plant at Melk, State of Lower Austria; mine and plant at St. Georgen an der Gusen, State of Upper Austria	NA.
Do.	Quarzsande GmbH (Zementwerk LEUBE GmbH, 100%)	Mine and plant at Eferding, mine at Bruck-Waasen, and mine at Wolfsegg, State of Upper Austria	NA.
Steel, crude	Voest-Alpine Stahl AG (Voestalpine AG, 100%)	Plant at Donawitz, State of Styria, and plant at Linz, State of Upper Austria	8,500.
Talc and leucophyllite (white mica)	Naintsch Mineralwerke GmbH (Rio Tinto plc, 100%)	Talc mines at Lassing and Rabenwald, and plant at Oberfeistritz, State of Styria; talc and mica mine at Kleinfeistritz, and a plant at Weisskirchen, State of Styria	200.[e]
Do.	Aspanger Bergbau und Mineralwerke GmbH & Co. KG (Wietersdorfer & Peggauer Zementwerke GmbH, 100%)	Leucophyllite mine and mica processing plant at Aspangberg-Zöbern, State of Lower Austria	NA.
Tungsten:			
Ore (scheelite), gross weight	Wolfram Bergbau- und Hütten- GmbH Nfg. KG (Sandvik AB, 100%)	Mine at Mittersill and processing plant in the Felbertauerntal, State of Salzburg	475.[e]
Carbide, metal, and oxide powders	do.	Primary and secondary chemical treatment and sintering plant at St. Martin, in the Sulmtal, State of Styria	NA.

[e]Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

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The Mineral Industry of Azerbaijan

By Richard M. Levine

Azerbaijan produced a range of metals and industrial minerals, including such metals as alumina, aluminum, iron ore, and steel. Its major importance as a world mineral producer, however, was based on its oil extracting industry. The country had been a significant oil producer for more than a century, but the focus since independence in 1991 was on developing offshore resources in the Caspian Sea. Oilfield and gasfield development was concentrated in two projects—the Azeri-Chirag-Guneshli (ACG) offshore oilfield complex and the Shah-Deniz offshore gas condensate field (State Oil Company of Azerbaijan Republic, 2008).

Minerals in the National Economy

In 2009, the mining and quarrying sector accounted for 44.8% of the gross domestic product (GDP) compared with 52.7% in 2008. In 2009, as in 2008, almost all the output in the mining and quarrying sector was derived from the production of oil and natural gas. The production of refined petroleum products accounted for 2.2% of the GDP compared with 2.7% in 2008. In 2009, the production of other mineral products combined accounted for less than 1% of the GDP (State Statistical Committee of the Republic of Azerbaijan, 2010a). In 2009, of the 188,600 people employed in the industrial sector, 37,700 were employed in mineral extraction, 14,000 were employed in metallurgy and producing fabricated metal products, 9,100 were employed in producing nonmetallic metal products, and 5,900 were employed in producing refined petroleum products. Employment in each of these industrial activities was less than that of 2008 (State Statistical Committee of the Republic of Azerbaijan, 2010b).

Production

In 2009, oil production in Azerbaijan increased by 12.7% compared with that of 2008 to more than 50.4 million metric tons (Mt). Natural gas production, however, remained at about the 2008 level. Production fell significantly in most other mineral producing sectors. Data on mineral production are in table 1.

Structure of the Mineral Industry

State Oil Company of Azerbaijan Republic (SOCAR) was state-owned. It was responsible for producing oil and natural gas in Azerbaijan and for operating the country's two refineries and running the country's pipeline system. The Ministry of Industry and Energy, however, handled exports as well as exploration and production agreements with foreign companies. SOCAR had been a party to all international consortia developing oil and gas projects in Azerbaijan. On its own, SOCAR produced less than 20% of Azerbaijan's total oil output; the remainder was produced by the Azerbaijan International Operating Co. (AIOC). AIOC was a consortium of 10 petroleum companies that had signed extraction contracts with the Government of Azerbaijan. AIOC was led by BP p.l.c., which was the leading foreign investor and had been active in Azerbaijan since 1992. AIOC had made significant direct investments in the development of the ACG fields, as well as the construction of the Baku-Tbilisi-Ceyhan (BTC) pipeline (U.S. Energy Information Administration, 2010).

Many AIOC members were also involved in the consortium for the development of the Shah-Deniz gasfield. BP and Statoil ASA were the operators of the Shah-Deniz gasfield development project and held the largest shares (25% each) in the Shah-Deniz consortium. Other shareholders included OAO LUKOIL Co., Oil Industries' Engineering and Construction (OIEC) of Iran, SOCAR, and Total S.A. of France, each of which had a 10% stake, and Türkiye Petrolleri A.O. (TPAO) of Turkey, which had a 9% stake (U.S. Energy Information Administration, 2010).

Azerigaz Production Union, which was a subsidiary of SOCAR, was responsible for natural gas processing, transport, distribution, and storage, mainly in the domestic market. Azneft Production Union (another SOCAR subsidiary) was responsible for exploration, development, and production from the older onshore and offshore natural gasfields owned directly by SOCAR (U.S. Energy Information Administration, 2010).

Commodity Review

Metals

Aluminum.—Aluminum production in 2009 was estimated to have decreased significantly. Azerbaijan reportedly exported 13,441 metric tons (t) of aluminum, which was a 76% decrease in exports compared with that of 2008 (News.Az, 2010). In 2007, the first and second electrolysis shops were commissioned at OJSC Azerbaijan Aluminum's (Azeraluminum's, or Azeral's) Sumgait aluminum smelter, which increased Sumgait's aluminum production capacity to 60,000 metric tons per year (t/yr). Azeraluminum's alumina production enterprise, which was based in the city of Ganca (Gəncə), had increased its alumina production capacity from 87,000 t in 2001 to 423,600 t in 2006. In 2009, however, Azeraluminum shut down its alumina production enterprise because of a global lack of demand for aluminum products (News.Az, 2010; ABC.AZ, 2011).

In March 2008, the President of Azerbaijan participated in an official ceremony for laying the foundation for the Ganca Integrated Steel Complex of Dashkesan Filizsaflashdirma JSC and the DET.AL aluminum smelter, which was to be constructed in the city of Ganca. The DET.AL aluminum smelter would have a production capacity of 100,000 t/yr. The construction of the new aluminum smelter would be carried out by China's Sichuan Machinery & Equipment Import & Export Co. Ltd., and the engineering would be carried out by Guiyang Aluminum & Magnesium Engineering & Research Institute (GAMI) of China.

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Azerbaijan's aluminum production capacity would be increased to 160,000 t/yr from 60,000 t/yr, which would enhance the country's aluminum export potential (Noble Group, 2008).

Copper, Gold, and Silver.—In May, Anglo Asian Mining plc began producing gold at the Gedabek gold and copper mine, which is located about 55 kilometers (km) from the city of Ganca. Anglo Asian was controlled by R.V. Investment Group Services, and the Azerbaijan Government owned a 49% stake. Azerbaijan expected to increase its gold production by more than sixfold compared with that of 2009 to 7 t/yr by 2014, based mainly on increased production at Gedabek (Antidze, 2011). Anglo Asian also planned to begin producing copper and silver from ore from the mine beginning in 2010 (Anglo Asian Mining plc, 2011).

Iron and Steel.—The Ganca Integrated Steel Complex, which was under construction, would handle the whole steel production cycle from the processing of iron ore to production of the final product and would consist of a concentrator, a beneficiation plant, a direct-reduced iron plant, a pellet plant, and a steel melting shop. This complex would be constructed by EKON A.S. of Turkey based on technologies developed by Italy's Danieli & C. SpA and the Techint Group. The steelmaking plant would have the capacity to produce 1 million metric tons per year (Mt/yr) of steel billet. The investment period for the project was to be between 2008 and 2011. The steel produced at the steel melt shop would create domestic production capacity for producing high-quality steel pipes for the oil industry, as well as construction materials, rebar, and other metal products (Noble Group, 2008).

Mineral Fuels

Natural Gas.—In 2009, natural gas production remained at about its 2008 level. According to the Oil and Gas Journal, Azerbaijan has proven natural gas reserves of approximately 30 trillion cubic feet (about 850 billion cubic meters) as of January 2010 (U.S. Energy Information Administration, 2010). According to Azerbaijan's Minister of Industry and Energy, Azerbaijan's has confirmed natural gas reserves of up to 3.5 trillion cubic meters (Interfax Russia & CIS Oil and Gas Weekly, 2010).

In 2009, Azerbaijan consumed about 64% of the natural gas it produced and exported the remainder. Almost all Azerbaijan's natural gas was produced from offshore fields, which included fields in the ACG complex and the Shah-Deniz offshore field. The Guneshli field, which was part of the ACG oil and gas fields system, provided associated gas to the Azerigaz system for domestic use. The country's leading offshore natural gas field was the Shah-Deniz natural gas condensate field, which was under development by the Shah-Deniz consortium. Increases in Azerbaijan's natural gas production were expected to come from increased production of associated gas from the ACG field system from which natural gas production was expected to increase by 30% by 2013, and from continuing development of the Shah-Deniz field, which was the world's largest natural gas discovery since 1978. According to BP, which was the project's technical operator, Shah-Deniz was estimated to have potential reserves of approximately 35 trillion cubic feet (about 990 billion cubic meters) of natural gas (U.S. Energy Information Administration, 2010). According to Azerbaijan's Minister of Industry and Energy, proved reserves at the Shah-Deniz gas condensate field are 1.2 trillion cubic meters (Interfax Russia & CIS Oil and Gas Weekly, 2009, 2010).

Shah-Deniz is located offshore in the Caspian Sea approximately 60 miles southeast of Baki. Azerbaijan began exporting natural gas during the spring of 2007 owing to increased output from Shah-Deniz. The field produced 110 billion cubic feet (about 3.1 billion cubic meters) in 2008 and increased output to approximately 250 billion cubic feet (about 7.1 billion cubic meters) in 2009. Phase 1 output was expected to peak in 2010 at 304 billion cubic feet (about 8.6 billion cubic meters) (U.S. Energy Information Administration, 2010).

Phase 2 was expected to have a peak capacity of 700 billion cubic feet (about 20 billion cubic meters). The lack of a transit agreement between Turkey and Azerbaijan had delayed completion of phase 2, which was projected for 2016. A number of utilities in Western Europe were seeking to secure supplies for the proposed Nabucco pipeline, which, if completed, would transport natural gas from the Caspian Sea to Europe by way of Turkey. Phase 2 of Shah-Deniz was expected to be a major source of natural gas for the Nabucco pipeline. In addition, the Italy-Turkey-Greece pipeline (ITGI) and the proposed Trans-Adriatic pipeline (TAP) were expected to transport gas from the Shah-Deniz field to Europe (U.S. Energy Information Administration, 2010).

Before the startup of the Shah-Deniz natural gas field, Azerbaijan had been importing natural gas from Russia. In 2009, Azerbaijan exported natural gas mainly by way of the South Caucasus pipeline (SCP) but had also used other pipelines to export gas to Russia and Iran. In exchange, Iran was supplying natural gas to Azerbaijan's Naxcivan exclave, which was physically separated from Azerbaijan by Armenia (U.S. Energy Information Administration, 2010).

Oil.—In 2009, oil production in Azerbaijan increased by 12.7% compared with that of 2008, and oil production was expected to continue to increase in 2010. The increase in oil output was somewhat lower in 2009 than was expected owing to a prolonged partial shutdown at the ACG project early in 2009 as a result of a gas leak. The ACG fields located 62 miles (99.78 km) east of Baki in the Caspian Sea were Azerbaijan's leading oil producers. Peak production from ACG was expected to reach 1.1 million barrels per day (about 55 Mt/yr) in 2010 (U.S. Energy Information Administration, 2010).

In Azerbaijan, a number of offshore exploration projects resulted in dry holes, which either contained no hydrocarbons or the oil discovered was deemed to be noncommercial (not economic to extract). Also, exploration was further dampened by boundary disputes regarding sectoral demarcation of the Caspian Sea (U.S. Energy Information Administration, 2010).

Onshore production was relatively small compared with offshore production. In 2009, Azerbaijan had some nine onshore oil production-sharing agreements at various fields, which accounted for only a fraction of total oil production (U.S. Energy Information Administration, 2010).

According to the U.S. Energy Information Administration, Azerbaijan exported an estimated 876,000 barrels per day

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(about 43.5 Mt) in 2009, which was a 16% increase compared with that of 2008. Most of Azerbaijan's oil was exported by pipeline, but small amounts were shipped by truck and railway. Azerbaijan had three major export pipelines. The majority of oil exports passed through the BTC pipeline system, which runs 1,110 miles (about 1,790 km) from the ACG fields in the Caspian Sea through Georgia to the Mediterranean Port of Ceyhan, Turkey. From there the oil was shipped by tanker mainly to European markets. The BTC pipeline was also used to export oil from Kazakhstan. The Baku-Novorossiysk pipeline is 830 miles (about 1,300 km) long and extends to Novorossiysk, Russia, on the Black Sea. The Baku-Supsa pipeline runs 520 miles (about 840 km) from Baki to Supsa, Georgia, on the Black Sea (U.S. Energy Information Administration, 2010).

Outlook

Azerbaijan has been a major focus of foreign investment in the Caspian region in its oil and gas sectors and is emerging as one of the Caspian region's most important exporters of oil and natural gas. Supplies of natural gas and oil from Azerbaijan are expected to increase in the future. Continued disputes with Armenia over the Nagorno-Karabakh region, as well as issues with Armenia concerning Azerbaijan's access to the Naxcivan exclave, however, continue to provide some political risk for investors. Also, conflicting claims between Azerbaijan and Iran concerning maritime and seabed boundaries of the Caspian Sea provide continuing uncertainty. Iran is insisting on an even one-fifth allocation among the Caspian Sea's five littoral states and is challenging Azerbaijan's hydrocarbon exploration in disputed waters. Furthermore, bilateral talks continue with Turkmenistan on dividing the seabed, and the countries are contesting ownership of oilfields in the middle of the Caspian Sea. Offshore exploration for oil and gas could receive renewed interest and additional foreign investment if the littoral states reach an agreement on the legal status and borders in the Caspian Sea (U.S. Energy Information Administration, 2010).

The construction of a new steel complex and aluminum smelter is expected to increase the role of the nonoil sector in the country's economy as the implementation of both projects will create new opportunities for the development of the metallurgical sector. They are expected to create jobs, enhance the export potential of the country, and add to tax payments (Noble Group, 2008). Reserves of gallium in aluminum raw materials give the country the potential to produce gallium.

References Cited

ABC.AZ, 2011, Azerbaijan aluminum factory complex halted manufacture because of flat market: ABC.AZ, January 28. (Accessed January 28, 2011, at http://abc.az/eng/news/34103.html.)

Anglo Asian Mining plc, 2011, Anglo Asian Mining plc ('Anglo Asian' or 'the company') final results: Anglo Asian Mining plc, May 26, 17 p. (Accessed May 29, 2011, at http://www.aamining.com/downloads/Final_Results_26_05_11.pdf.)

Antidze, Margarita, 2011, Anglo-Asian says Azerbaijan gold mines' results good: Reuters Africa, February 22. (Accessed May 28, 2011, at http://af.reuters.com/article/metalsNews/idAFANT25054820110222?pageNumber=2&virtualBrandChannel=0.)

Interfax Russia & CIS Oil and Gas Weekly, 2009, Azerbaijan forecasts gas production to increase 23% by 2013: Interfax Russia & CIS Oil and Gas Weekly, issue 43, October 29-November 5, p. 23.

Interfax Russia & CIS Oil and Gas Weekly, 2010, Azerbaijan's confirmed gas reserves at 3.5 trln cubic meters: Interfax Russia & CIS Oil and Gas Weekly, issue 15, April 16-24, p. 18.

News.Az, 2010, Azerbaijan's aluminum export drops over previous year: News. Az, May 24. (Accessed January 28, 2011, at http://www.news.az/articles/16088.)

Noble Group, 2008, Announcement from our partners Det.AL group of companies in Azerbaijan: Noble Group, March 3. (Accessed February 1, 2011, at http://thisisnoble.com/index.php?option=com_content&task=view&id=453&Itemid=317&lang=es.)

State Oil Company of Azerbaijan Republic, 2008, June oil strategy Azerbaijan—Successes and perspectives: State Oil Company of Azerbaijan Republic, June 6. (Accessed January 30, 2009, at http://socar.az/1128-news-view-en.html.)

State Statistical Committee of the Republic of Azerbaijan, 2010a, Azerbaijan in figures—Gross domestic product: State Statistical Committee of the Republic of Azerbaijan. (Accessed January 30, 2011, at http://www.azstat.org/publications/azfigures/2010/en/ 010.shtml.)

State Statistical Committee of the Republic of Azerbaijan, 2010b, Azerbaijan in figures—Industry: State Statistical Committee of the Republic of Azerbaijan. (Accessed January 30, 2011, at http://www.azstat.org/publications/azfigures/2010/en/012.shtml.)

U.S. Energy Information Administration, 2010, Azerbaijan: U.S. Energy Information Administration country analysis brief, November. (Accessed August 17, 2011, at http://www.eia.gov/countries/cab.cfm?fips=AJ.)

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TABLE I

AZERBAIJAN: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	2005	2006	2007	2008	2009
METALS					
Alumina	314,765 r	362,665 r	184,483	164,879	40,000
Aluminum, primary and secondary	31,762	31,852	39,241	61,607	30,000 e
Iron ore, marketable:					
Gross weight	7,300	11,300	17,600	28,100	--
Fe content e	3,650	5,650	8,800	8,600	--
Steel:					
Crude	286,117	54,309	273,393	100,000 r,e	50,000 e
Pipes	1,257	14,108	25,706	28,196	6,900
INDUSTRIAL MINERALS					
Bentonite	53,700 r	40,644	50,459	40,700 r	7,000
Bromine e	2,000	2,000	2,000	3,500	3,500
Caustic soda	30,000	30,509	18,013	20,635	7,000
Cement	1,537,900	1,622,000	1,690,800 r	1,594,900 r	1,283,400
Gypsum	28,242	35,034	22,037	38,375	45,630
Iodine e	300 r	300 r	300 r	300	300
Lime, construction	684	1,318	15,294	27,175	4,342
Limestone	1,256,443	1,416,039	1,413,031	1,363,978	1,000,000 e
Salt	11,202	12,029	7,127 r	7,527 r	5,466
Sand, construction	662,410	986,700	702,100	1,247,200	801,100
Sulfuric acid	18,800	19,700	24,800	39,400	12,100
MINERAL FUELS AND RELATED MATERIALS					
Natural gas thousand cubic meters	5,820,056	6,820,065	10,832,100	16,336,500	16,325,000
Petroleum:					
Crude	22,484,308	33,049,128	43,336,197	44,720,275	50,416,000
Refinery products	7,655,900	7,788,800	8,088,500	6,885,300	6,000,000 e

eEstimated; estimated data are rounded to no more than three significant digits. rRevised. -- Zero.

[1]Table includes data available through January 31, 2011.

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TABLE 2
AZERBAIJAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1,2]

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Locations or deposit names	Annual capacity[e]
Alumina	Gyandzha refinery	Ganca	450,000
Aluminum	OJSC Azerbaijan Aluminum [Azeraluminum (Azeral)] Sumgait smelter	Sumqayit	60,000
Alunite ore	Zaglik alunite mining directorate	Zaylik, Dashcasan region	600,000
Cement	Plants: Karadagly Tauz	Locations: Qaradagli Tavuzcay region	2,000,000 [3]
Clays, bentonite	Dash-Salakhlinskoye deposit	do.	100,000
Copper ore	Karadagskiy complex	Samkir region	30,000
Iodine and bromine	Baku, Karadagly, and Novaneftechala plants	Process oil well brines at plants in Baki, Qaradagli, and Neftcala	NA
Iron ore, marketable	Dashkasan mining directorate	Daskasan region	50,000
Natural gas, processing	Karadagly plant	Qaradagli region	NA
Petroleum and natural gas:			
Crude petroleum and gas condensate	Azerbaijan International Operating Co., (AIOC) in conjunction with BP p.l.c., Chevron Corp., State Oil Company of Azerbaijan Republic (SOCAR), Inpex Corp., Statoil ASA, Exxon Mobil Corp., Türkiye Petrolleri A.O. (TPAO), Itochu Corp., Devon Energy Corp., and Delta Hess (joint venture of Delta Oil and Hess Corp.)	Azeri-Chirag-Guneshli (ACG) offshore oilfields in the Caspian Sea	55,000,000
Natural gas billion cubic meters	International consortium consisting of BP p.l.c., Statoil ASA, OAO LUKOIL Co., Oil Industries' Engineering and Consulting (OIEC), State Oil Company of Azerbaijan Republic (SOCAR), and Türkiye Petrolleri A.O. (TPAO)	Shah-Deniz gas condensate field	7.1
Petroleum, refined	Azernefteyag refinery	Baki	12,000,000 [4]
Do.	Heydar Aliev Baku refinery	do.	8,000,000 [4]
Rock salt	Hehram and Pusyan deposits	Naxcivan region	2,500,000
Steel:			
Crude	Baku Steel Works	Baki	400,000
Pipe, tubes	Azerboru JSC	Sumqayit	400,000

[e]Estimated. Do., do. Ditto. NA Not available.
[1]Table includes data available through January 31, 2011.
[2]Many location names have changed since the breakup of the Soviet Union. Many enterprises, however, are still named or commonly referred to based on the former location name, which accounts for discrepancies in the names of enterprises and that of locations.
[3]Capacity estimates are totals for all enterprises that produce cement.
[4]Capacity for crude petroleum distillation.

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The Mineral Industry of Belarus

By Richard M. Levine

Belarus had a number of mineral production enterprises, including a steel minimill, a nitrogen production enterprise, two oil refineries, and a potash mining enterprise. The country's only mineral production enterprise that played a major role in world markets was its potash production enterprise. An oil pipeline that passes through Belarus transported about 70 million metric tons per year (Mt/yr) of Russian oil to Europe, and a gas pipeline that passes through Belarus was a significant export route for gas from Russia to Europe (National Statistical Committee of the Republic of Belarus, 2010a).

Minerals in the National Economy

In 2009, industrial production accounted for 93% of Belarus's gross domestic product (GDP). The fuel sector accounted for 19.4% of the value of industrial production; the chemical and petrochemical sector, 12.1%; the construction materials sector, 5.5%; ferrous metallurgy, 3.2%; and nonferrous metallurgy, 0.3%. The GDP increased by 0.2% in 2009 compared with that of 2008, and the value of industrial output decreased by 2.8% in current prices (National Statistical Committee of the Republic of Belarus, 2010a, p. 95; 2010c, d).

The economy of Belarus was dependent on oil and natural gas imported from Russia. Furthermore, a large percentage of Russia's oil and natural gas exports to Eastern and Western Europe were shipped on pipelines that traversed Belarus. In late 2006, Russia began a process of reducing its subsidies on oil and gas that it exported to Belarus. In December 2006, following a short-term dispute, Belarus and Russia agreed on a schedule of graduated price increases that would increase the price that Belarus would pay for gas to the European market price level. Under the arrangement, the Russian gas producing company OAO Gazprom was to raise prices for gas deliveries to Belarus in 2010 to an average of $171 per 1,000 cubic meters, which was much greater than the subsidized previous price of $46 but still less than one-half the price paid by European Union (EU) member states. The price for Russian gas was to continue to increase until 2011, when it was to equal the price paid by EU members. Belarus officials stated in late 2008 and early 2009, however, that Belarus was interested in postponing the rise to EU prices until 2014-15.

Belarus and Russia also engaged in disputes concerning Russian oil exports. In December 2006, Russia decided to levy a duty on oil exported to Belarus in order to recoup profits from Belarus's processing of previously duty-free Russian-sourced crude oil, as Belarus then exported the refined products at world market prices. In January 2007, Belarus and Russia agreed on a duty for oil exports to Belarus and that Belarus would not charge a duty on oil that Russia shipped through Belarus. This agreement resolved a dispute in which Belarus, in response to an initially higher duty that Russia had imposed, began to charge a duty on oil that Russia shipped through Belarus; Russia responded by temporarily discontinuing oil exports through Belarus. In January 2010, another dispute arose as Belarus and Russia failed to agree on renewing the January 2007 agreement. A new accord was subsequently reached whereby Russia would export oil duty free for Belarus's internal consumption but oil to be processed for reexport would be subject to full export duties (U.S. Department of State, 2010; U.S. Energy Information Administration, 2010a, b).

Production

In 2009, production of potash in Belarus decreased by 52% to 2.485 million metric tons (Mt). Belarus reduced its production of crude steel by 7.9% to 2.449 Mt; finished roll, by 3.7% to 2.299 Mt; and steel pipe, by 26.4% to 106,700 metric tons (t). Production of crude oil decreased by 1.1% to 1.72 Mt. Production of cement, however, increased by 3.1% to 4.35 Mt (Interfax Russia & CIS Statistics Weekly, 2010; Jasinski, 2010).

Structure of the Mineral Industry

The Belneftekhim State Concern for Oil and Chemistry, which included among its many enterprises the country's oil production, refining, and transport facilities and potash production enterprise, was the leading concern in the country. It consisted of 50 organizations, including the Open Joint Stock Company (OJSC) Grodno Azot, which specialized in the production of liquefied ammonia and nitrogenous fertilizer; Joint Stock Company (JSC) Belaruskali, which mined the Starobin potash deposit; and practically all enterprises that produced chemical products. In 2006, Belaruskali and the Russian firm OJSC Uralkali founded the Belarus Potash Co., which supplied potash produced by Belaruskali and Uralkali to world markets (Open Joint Stock Company Uralkali, 2010).

Commodity Review

Metals

Iron and Steel.—The Byelorussian Steel Works (BMZ) in Zhlobin was a minimill that consisted of four main production facilities that were involved in steel melting, rolling, steel cord and wire production, and pipe rolling. The plant also included a number of auxiliary divisions and an administrative division. The steel-melting facilities included a scrap preparation shop and two electric steel melting shops. The rolling production facilities consisted of a section rolling shop, which included three rolling mills with different profiles. The steel cord and wire production facilities included three steel cord and wire shops, a powder metallurgy and die workshop, and a packing workshop. The pipe production facility was located in a separate building that covered an area of 40,000 square meters. The infrastructure facilities consisted of maintenance and repair departments for power, electrical, and mechanical equipment;

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a railway workshop; an automobile workshop; and other auxiliary divisions. BMZ exported its products to 71 countries on five continents. In 2009, it supplied steel products for the first time to Afghanistan, Ghana, Iran, Iraq, Israel, Morocco, Nigeria, Philippines, Senegal, Sudan, and other countries of Africa and the Middle East (Byelorussian Steel Works, 2009; 2010b).

In 2009, BMZ exported 1,955,700 t of steel products, of which 62.7% was rolled products, 16.6% was cast billets, 13.2% was steel cord, 3.4% was other types of steel wire, 2.3% was hose wire, and 1.8% was bead wire. Prices for steel products fell precipitously in 2009, and sales proceeds for BMZ were only 55.62% of what they were in 2008. The physical volume of output of steel products decreased by only 4.2%, however (Byelorussian Steel Works, 2010a, p. 14, 22, 26).

Industrial Minerals

Nitrogen.—OAO Grodno Azot specialized in the production of liquid ammonia and nitrogenous fertilizers. It had the capacity to produce 976,800 metric tons per year (t/yr) of liquid ammonia, 785,000 t/yr of carbamide, 720,000 t/yr of a carbamide ammonia mixture (KAS), and 319,000 t/yr of ammonium sulfate. About 60% of the company's output was sold on the domestic market, which fully satisfied domestic demand, and the remainder was exported by the company (OAO Grodno Azot, 2010).

In 2009, Belarus increased production of ammonia (nitrogen content) by 9.7% to 891,700 t compared with 812,400 t in 2008 and produced 727,400 t of nitrogenous fertilizers, which was comparable to the 2008 level of production. In 2009, Belarus almost doubled its exports of nitrogenous fertilizers, with exports increasing in 2009 to 305,600 t compared with 153,900 t in 2008 (Interfax Russia & CIS Statistics Weekly, 2010; Joint Stock Company Belaruskali, 2010a; National Statistical Committee of the Republic of Belarus, 2010b).

Potash.—In 2009, potash production in Belarus decreased by about 50% compared with that of 2008 to 2.485 Mt from 4.968 Mt in 2008, and potash exports decreased by 46.3% to 1.759 Mt in terms of K_2O (Interfax Russia & CIS Statistics Weekly, 2010; National Statistical Committee of the Republic of Belarus, 2010b). The decrease in Belarus's potash production and potash exports reflected conditions in the world potash market in 2009 when potash prices fell by more than 50% as the effects of the global recession were felt throughout the agricultural sector, resulting in the collapse of grain and food prices. Farmers in developing countries had difficulty finding banks that would lend money to secure supplies of much-needed fertilizer. As a result, many farmers skipped applying potash to their fields and others relied on stockpiles. Relatively few buyers were seeking potash and those who did were seeking bargain prices (Toovey, 2010).

JSC Belaruskali was one of the world's leading potash producers. Belaruskali mined the Starobin potash deposit, which contained camalite, rock salt, and sylvinite. Commercial levels of potash occur there at depths of 400 to 1,200 meters (m) and deeper. The thickness of individual beds of potash varies from 4 to 20 m. The potassium chloride content of the crude ore extracted, which was composed of halite and sylvinite, was between 19% and 21%; the potassium chloride content of the sylvinite layer was between 30% and 35%. The halite extracted could be stored in worked-out faces of the mine (Krichenko and others, 2010).

Belaruskali was composed of four mining and processing complexes, auxiliary shops, and servicing units; it employed about 20,000 people. Each of the four mining and processing complexes comprised a potash mine and processing plant that produced potash fertilizers in the form of fine, fine crystallized, and granulated concentrate of potassium chloride. In addition, the company produced cooking salt, technical salt, edible salt, and feed salt (Joint Stock Company Belaruskali, 2010a, c).

The Belaruskali development program for the period 2006 to 2012 called for development of the Krasnoslobodskiy Mine and the construction of a new mine at the Beryozovskiy section of the deposit, which was planned to be operational in 2012. The program also called for renewing the stock of obsolete equipment to ensure the ability to maintain production capacities and to ensure the competitiveness of the product in terms of quality and price. The main objective of the program was to increase Belaruskali exports by increasing its production capacity to 9 Mt/yr of potash fertilizer. On May 7, 2009, commissioning of the first stage of the Krasnoslobodskiy Mine took place, and the first skip with ore from Krasnoslobodskiy was hoisted. The second stage was planned to go into operation in 2010 (Joint Stock Company Belaruskali, 2009; 2010a, b; Krichenko and others, 2010).

Outlook

Belarus is expected to continue to be a major supplier of potash to world markets. The program for the development of Belaruskali for the period 2006-12 addresses development of ore reserves and is based primarily on the commissioning of the Krasnoslobodskiy Mine and development of a new mine in the Beryozovskiy sector of the deposit, as well as on renovating out-of-date equipment. A main direction will be a continuous and steady increase in the quality of fertilizers to make them more competitive on the world market. Because it possesses a sufficient raw materials base, a high production potential, and highly qualified personnel, Belaruskali is expected to be a major world potash supplier for many decades to come (Joint Stock Company Belaruskali, 2010c).

References Cited

Byelorussian Steel Works, 2009, News from the beginning of the year—BMZ has expanded geography of its supplies by 17 countries: Byelorussian Steel Works, November 10. (Accessed December 18, 2010, at http://www.belsteel.com/newsru/indexe.php?cont=long&id=164&section=2.)

Byelorussian Steel Works, 2010a, Annual report 2009: Byelorussian Steel Works, 44 p. (Accessed December 18, 2010, at http://www.belsteel.com/doc/otchet-2009.pdf.)

Byelorussian Steel Works, 2010b, Manufacturing scheme: Byelorussian Steel Works. (Accessed December 17, 2010, at http://www.belsteel.com/eng/structura.php.)

Interfax Russia & CIS Statistics Weekly, 2010, Belarusian economy in 2009: Interfax Russia & CIS Statistics Weekly, issue 3, January 16-22, p. 7-21.

Jasinski, S.M., 2010, Potash: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 122-123.

Joint Stock Company Belaruskali, 2009, All news: Joint Stock Company Belaruskali. (Accessed December 15, 2010, at http://www.kali.by/english/news.html.)

Digitized by Google

Joint Stock Company Belaruskali, 2010a, About enterprise: Joint Stock Company Belaruskali. (Accessed December 15, 2010, at http://www.kali.by/english/genesis.html.)
Joint Stock Company Belaruskali, 2010b, Development perspectives: Joint Stock Company Belaruskali. (Accessed December 15, 2010, at http://www.kali.by/english/future.html.)
Joint Stock Company Belaruskali, 2010c, Home page: Joint Stock Company Belaruskali. (Accessed December 15, 2010, at http://www.kali.by/english/bel_main.html.)
Krichenko, V.M., Shpakovskiy, V.N., Dakuko, N.A., Kashtal'yan, M.N., and Kobyashev, 2010, V.D, RUP PO Belaruskaliy—Flagman mirovoy kaliynoy industrii [RUP PO Belaruskaliy—Flagman of the world potash industry]: Gornyy Zhurnal [Mining Journal], no. 8, p. 5-9.
National Statistical Committee of the Republic of Belarus, 2010a, Belarus i Rossiya 2010—Statisticheskiy sbornik [Belarus and Russia 2010—Statistical compendium]: National Statistical Committee of the Republic of Belarus, 179 p.
National Statistical Committee of the Republic of Belarus, 2010b, Official statistics—Exports of major products: National Statistical Committee of the Republic of Belarus. (Accessed December 18, 2010, at http://belstat.gov.by/homep/en/indicators/ftrade1.php.)
National Statistical Committee of the Republic of Belarus, 2010c, Official statistics—Main indicators of industry: National Statistical Committee of the Republic of Belarus. (Accessed December 20, 2010, at http://belstat.gov.by/homep/en/indicators/industry1.php.)
National Statistical Committee of the Republic of Belarus, 2010d, Official statistics—Main socio-economic indicators: National Statistical Committee of the Republic of Belarus. (Accessed December 20, 2010, at http://belstat.gov.by/homep/en/indicators/svod_2000_2009.php.)
OAO Grodno Azot, 2010, Otkrytoye aktsionernoye obshchestvo "Grodno Azot" [Open Joint Stock Company "Grodno Azot"]: OAO Grodno Azot. (Accessed December 15, 2010, at http://www.azot.by.)
Open Joint Stock Company Uralkali, 2010, Production assets: Open Joint Stock Company Uralkali. (Accessed August 26, 2010, at http://www.uralkali.com/eng/about/production_assets.)
Toovey, L.M., 2010, For the new year—Optimism permeates potash market: Potash Investing News, January 8. (Accessed December 18, 2010, at http://www.potashinvestingnews.com/790-for-the-new-year-optimism-permeates-potash-market.html.)
U.S. Department of State, 2010, Belarus: U.S. Department of State background note, August 27. (Accessed December 18, 2010, at http://www.state.gov/r/pa/ei/bgn/5371.htm.)
U.S. Energy Information Administration, 2010a, Russia—Natural gas: U.S. Energy Information Administration country analysis brief, November. (Accessed December 19, 2010, at http://www.eia.doe.gov/cabs/Russia/NaturalGas.html.)
U.S. Energy Information Administration, 2010b, Russia—Oil exports: U.S. Energy Information Administration country analysis brief, November. (Accessed December 19, 2010, at http://www.eia.doe.gov/cabs/Russia/Oil_exports.html.)

TABLE 1

BELARUS: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008	2009
METALS						
Steel:						
Crude	thousand metric tons	2,076	2,297	2,387	2,660	2,449
Rolled	do.	1,839	2,047	2,192	2,387 r	2,299
Pipes	do.	108,300	134,200	147,900	145,000 r,e	106,700
INDUSTRIAL MINERALS						
Cement	thousand metric tons	3,131	3,495	3,820	4,219	4,350
Diamond, synthetic[e]	thousand carats	25,000	25,000	25,000	25,000	25,000
Lime	thousand metric tons	785	853	925	950	950
Nitrogen, N content of ammonia		774,000	815,000	830,000	812,400 r	891,700
Potash, K_2O equivalent	thousand metric tons	4,844	4,605	4,972	4,968	2,485
Salt[2]		1,839,000	2,075,693	1,665,350	1,476,000 r	1,695,100
Sulfur		48,663	38,567	41,031	44,000 r	47,200
Sulfuric acid	thousand metric tons	737 r	756 r	788 r	857 r	833
MINERAL FUELS AND RELATED MATERIALS						
Natural gas	million cubic meters	228	219	201	203 r	205
Peat:						
Horticultural use[e]	thousand metric tons	300	300	318 [3]	395 [3]	272
Fuel use	do.	2,500 r	2,500 r	2,502 r	2,361 r	2,213
Total	do.	2,800	2,800	2,820	2,756	2,485
Petroleum:						
Crude	do.	1,785	1,780	1,760	1,740 r	1,720
Refined	do.	19,802	21,253	21,349	21,305	21,634

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. do. Ditto.

[1]Table includes data available through December 23, 2010.

[2]Includes byproduct salt from potash production.

[3]Reported figure.

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TABLE 2
BELARUS: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity[e]
Cement	Krichevskiy and Volkovysk plants	Mahilyowskaya Volbasts' and Wawkavysk	NA
Diamond	Gomel Production Association "Kristall"	Homyel'skaya Voblasts'	NA
Nitrogen, N content of ammonia	OAO Grodno "Azot" (Belneftekhim)	Hrodna region	976,800
Peat, fuel use	Production at 37 enterprises that produce mainly briquets	All regions of country	5,000,000 [1]
Petroleum:			
Crude	State Concern for Oil and Chemistry (Belneftekhim)	Rechitskoye, Ostashkovichskoye, Vishanskoye, Tishkovskoye and Yuzhno-Ostashkovichskoye deposits, Southeastern part of country	2,000,000
Refined	JSC Mozyr oil refinery (Government of Belarus, 42.7%, and Slavneft, 42.5%)	Homhyel'	16,000,000 [2]
Do.	Navapolatsk refinery (Naftan)	Vitsyebsk area	10,800,000 [2]
Potash, K_2O equivalent	Joint Stock Company Belaruskali	Starobin deposit, Salihorsk area	5,000,000
Steel:			
Crude	Belarusian Steel Works (BMZ) (Ministry of Industry)	Zhlobin	2,600,000
Pipe	do.	do.	250,000
Rolled	do.	do.	2,300,000
Do.	JSC Mogilev Metallurgical Works [Belarusian Steel Works (BMZ)]	Mahilyowskaya Voblasts'	80,000

[e]Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.
[1]Total peat for fuel use.
[2]Crude throughput.

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The Mineral Industries of Belgium and Luxembourg

By Alberto Alexander Perez

BELGIUM

Belgium is located at the heart of one of the world's most highly industrialized regions. It has an export-oriented economy, and as such, it was affected by the world economic slowdown. In 2009, the gross domestic product (GDP) based on purchasing power parity was $321 billion. Belgium's real GDP decreased by 1.5% compared with that of 2008.

In 2009, Belgium's industry depended greatly on nondomestic markets, especially those of other European Union (EU) countries. Its main trading partners were, in order of the percentage of total trade, Germany (which accounted for 19.5% of Belgium's exports and 17.7% of its imports), the Netherlands (11.9% of exports and 17.6% of imports), France (16.7% of exports and 11.2% of imports), the United Kingdom (7.6% of exports and 6.2% of imports), the United States (5.7% of exports and 5.4% of imports), Italy (5.2% of exports), Ireland (4.9% of imports) and China (4.1% of imports). More than one-half of Belgium's GDP stemmed from foreign sales, which was one of the highest percentages of the industrialized nations. Belgium, Luxembourg, and the Netherlands comprise the BENELUX customs unit, which is an economic union aimed at reinforcing cross-border cooperation between the three countries (U.S. Department of State, 2010).

Minerals in the National Economy

Trading of diamond and processing of metals were the leading mineral industries in Belgium. The country had no economically exploitable reserves of coal or metallic ores in 2009.

The country imported substantial quantities of raw materials. The metal processing industries were significant to the Belgian economy, in particular, steel. Belgium was the 18th ranked producer of steel in the world, producing 10.7 million metric tons in 2008 (the latest year for which rankings were available) (World Steel Association, 2009, p. 9).

Umicore Group (Umicore), which was one of Europe's leading metal recyclers and processors, was headquartered in Hoboken, Belgium. Its most profitable business sectors were the zinc processing division; the advanced materials division, which dealt with processing such minerals as cobalt and germanium; and the precious metals processing division (N.V. Umicore S.A., 2009).

According to the Antwerp World Diamond Centre, Antwerp was the primary business center for the diamond industry. It was the hub of the secondary diamond market, meaning that most of the uncut stones that were not sold by the Diamond Trading Company (DTC) (a subsidiary of the De Beers Group) were sold in Antwerp. The city was also a center of operations for the primary rough diamond market—the most valuable stones in the diamond trade were cut mainly in Antwerp and, although the manufacturing (cutting and polishing) of most other stones was performed in other countries, the manufacturing process was controlled mostly from Antwerp. The rough diamonds were sorted and planned in Antwerp, then dispatched from Antwerp to cutting plants across the globe. Later, these diamonds returned to the city as polished diamonds to be sold in the jewelry markets. Of Antwerp's four diamond exchanges, three served primarily the polished diamond trade (Antwerp World Diamond Center, 2010).

Production

Owing to the world economic recession and the slowdown in the car manufacturing market, the steel industry in Belgium suffered a decrease in production of crude steel of 47% and a decrease in the production of pig iron of 57%. The effect of the recession on other sectors of the mineral industry was not clear owing to lack of data. Because the Belgian economy relied heavily on exports, however, the slowdown of global demand most likely affected the other sectors of the Belgian mineral economy significantly as well.

Mining was less important to the country's economy than in the past, and in 2009, just as in 2008, mining was conducted only for industrial minerals. The refining of copper, minor metals, and zinc, and the production of steel were the leading mineral industries in Belgium. The country was also a producer of cadmium, cobalt, germanium, selenium, and tellurium. Belgium's well-developed industrial minerals sector included the production of such industrial and construction materials as carbonates, cement, dolomite, limestone, and silica sand (table 1).

Structure of the Mineral Industry

The principal mining and mineral-processing facilities in Belgium, with their locations and capacities, are listed in table 2. Most facilities were privately owned either by Belgian companies or other EU companies.

Commodity Review

Metals

Iron and Steel.—By January 2009, one of ArcelorMittal Liège's two blast furnaces was still idle, although the company brought it back online in the second half of the year. ArcelorMittal's Gent and Liege plants were heavily reliant on demand from the car manufacturing industry; as such, demand for the company's products was reduced by the car industry's slowdown. Duferco-Sif's three plants also decreased production by about 30% in response to market conditions (Business Monitor International, 2010).

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Zinc.—Nyrstar NV reported that the Balen smelter had been on care-and-maintenance status between December 2008 and September 2009 until market conditions facilitated the restart of the operation. By the end of 2009, the smelter was functioning at 70% capacity, and it was expected to reach full capacity by the end of the first quarter of 2010. In May 2009, Nyrstar acquired the Gordonsville Zinc mine complex in Tennessee, and in November, the company completed its acquisition of an 85% interest in the Coricancha polymetallic mine in Peru (Nyrstar NV, 2010).

Industrial Minerals

Diamond, Industrial.—Belgium's polished and rough diamond trade slowed severely by the end of 2008 and through 2009. From October 2008 to February 2009, imports and exports of rough diamond were down by 60% compared with the same period of the previous year. Much of this decrease was owing to the drop in demand for diamond in the United States, where about one-half of the world's polished diamond was used by the jewelry industry (Chu, 2009).

Mineral Fuels and Other Sources of Energy

Natural Gas and Petroleum.—Vitol Tank Terminals B.V. (VTTI) through its subsidiary Eurotank Belgium B.V. [which was part of the Vitol Group (Vitol)], entered into a purchase agreement with Universal Holding B.V. and Petroplus International B.V. (Petroplus) to acquire a 100% interest in Petroplus Refining Antwerp N.V. and Petroplus Refining Antwerp Bitumen N.V. (PABR) in October (Vitol Tank Terminals B.V., 2010).

It was expected that by January 2010, the Swedish company Nynas AB (Nynas) and Vitol would strike a bitumen supply deal following the foreseen transfer of the PABR plant. Nynas expected to continue supplying crude oil to the plant, which would be renamed Antwerp Processing Co., and to continue to manufacture bitumen to be supplied to Nynas (Nynas AB, 2010).

Renewable Energy.—In 2009, Umicore decided to build an industrial-scale recycling facility for end-of-life rechargeable batteries at its Hoboken site. The investment, according to Umicore, would enable the company to deal with the expected growth in the availability of end-of-life rechargeable batteries, such as those used by hybrid electric vehicles. The plant was expected to start operating in the first half of 2011 (N.V. Umicore S.A., 2010, p. 14).

Outlook

Belgium is expected to remain a significant mineral processor and major diamond trader. Its steel production is expected to increase as demand increases and the automobile market is reactivated. Belgium is also expected to remain significant in international and intra-European cargo handling of mineral products through its major ports. The four ports in Flanders (Antwerp, Ghent, Ostend, and Zeebrugge), which are all located within 100 km of each other, are leading players in international and intra-European cargo handling and are expected to remain so. The Port of Antwerp is a particularly important link in the chain of international trade, ranking only second in Europe to the Port of Rotterdam in terms of gross tonnage throughput and third after Rotterdam and Hamburg in terms of the number of containers passing through the port. The importance that Belgium has been giving to renewable energies is expected to continue.

References Cited

Antwerp World Diamond Centre, 2010, Profile of the Antwerp Diamond Centre: Antwerp World Diamond Centre. (Accessed May 26, 2010, http://www.awdc.be/profile-antwerp-diamond-centre.)

Business Monitor International, 2010, Belgium metals report—Q1 2010: Business Monitor International, Abstract. (Accessed May 27, 2010, at http://www.marketresearch.com/product/display.asp?productid=2578042&xs=r.)

Chu, Henry, 2009, Diamond industry rocked by soft market: Los Angeles Times, April 16. (Accessed May 22, 2010, at http://articles.latimes.com/2009/apr/16/business/fi-diamonds16.)

N.V. Umicore S.A., 2009, Fact sheet: N.V. Umicore S.A. (Accessed January 20, 2010, at http://tools.euroland.com/factsheet/b-unim/factsheethtml.asp.)

N.V. Umicore S.A., 2010, Report to shareholders and society 2009: N.V. Umicore S.A., 152 p. (Accessed April 24, 2010, at http://www.investorrelations.umicore.com en/newsPublications/resultsReports/2009YR/AR2009_EN.pdf.)

Nynas AB., 2010. Bitumen supply agreement with Vitol: Nynas AB. (Accessed April 28, 2010, at http://www.nynas.com/templates/page____10635.aspx?epslanguage=EN.)

Nyrstar NV, 2010, Annual report 2009: Nyrstar NV, 122 p. (Accessed May 25, 2010, at http://www.investis.com/nystar-report/Nyrstar-Annual-report-2009-EN.pdf.)

U.S. Department of State, 2010, Belgium: U.S. Department of State background note. (Accessed May 26, 2010, at http://www.state.gov/r/pa/ei/bgn/2874.htm.)

Vitol Tank Terminals B.V., 2010, Vitol enters into a definitive agreement to acquire refining facilities from Petroplus: VTTI News. (Accessed April 26, 2010, at http://www.vtti.com/news_01.php?id=44).

World Steel Association, 2009, World steel in figures: Brussels, Belgium, World Steel Association, 28 p.

LUXEMBOURG

Minerals in the National Economy

In 2009, Luxembourg's mineral industry comprised mainly mineral information systems, mineral trading, and raw materials processing. Because it is a member of the Belgium Luxembourg Economic Union (BLEU), trade statistics for Luxembourg are inextricably linked with those of Belgium and, therefore, cannot be listed individually. International trade data for Belgium and Luxembourg are given in the Belgium section of this chapter. The iron and steel industry was Luxembourg's most valuable mineral industry sector, and steel was the country's main export commodity.

Production

Mining in Luxembourg was represented by small industrial mineral operations that produced material only for domestic consumption. These minerals included dolomite, limestone, sand and gravel, and slate. Information on these operations was not readily available. Some commodity production data are in table 1.

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Structure of the Mineral Industry

The principal mineral facilities in Luxembourg with their locations and capacities are listed in table 2. Most facilities were privately owned.

Commodity Review

Metals

Iron and Steel.—ArcelorMittal, which was headquartered in Luxembourg, was the leading steel manufacturer in the world. It produced three times more steel than its nearest rival, Nippon Steel Corp. of Japan (World Steel Association, 2009, p. 8).

Luxembourg's steel production decreased by 14% in 2009 compared with production in 2008. In 2009, ArcelorMittal halved worldwide production and offered voluntary buyouts to 9,000 of its 315,000 workers. In May during the annual shareholders meeting at its Luxembourg headquarters, steel workers were bused in from several plants to stage a protest and broke in through the front door, attacking the premises (Guardian, The, 2009).

Acieries Reunies de Burbach-Eich-Dudelang (ARBED), which was a subsidiary of ArcelorMittal, dominated Luxembourg's mineral industry. ARBED was the major producer of crude steel, pig iron, and stainless steel, all of which were produced from imported material. The company specialized in the production of large structural beams and specialized value-added products (ArcelorMittal, 2009).

Outlook

Luxembourg is expected to continue as a producer and exporter of steel. The industrial mineral production will be limited to domestic consumption.

References Cited

ArcelorMittal, 2009, History of ARBED: ArcelorMittal. (Accessed September 28, 2009, at http://www.arcelormittal.com/index.php?lang=en&page=548.)

Guardian, The, 2009, Steel workers storm ArcelorMittal meeting: London, United Kingdom, The Guardian, May 13. (Accessed April 19, 2010, at http://www.guardian.co.uk/business/2009/may/13/arcelor-mittal-steel.)

World Steel Association, 2009, World steel in figures: Luxembourg, World Steel Association, 28 p.

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TABLE 1

BELGIUM AND LUXEMBOURG: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Country and commodity		2005	2006	2007	2008	2009[e]
BELGIUM[2]						
Metals:						
Aluminum, secondary including unspecified metals[e]		100	125	125	125	100
Bismuth, metal[e]		500	500	500	500	500
Cobalt, primary[3]		3,298	2,840	2,825	3,020 r	3,000
Copper:						
Smelter, secondary		97,200	114,600	115,200	124,500	124,000
Refined, primary and secondary		382,000 e	382,600	394,400	395,800	395,000
Iron and steel:						
Pig iron	thousand metric tons	7,254	7,516	6,576	7,125 r	3,087 4
Steel:						
Crude	do.	8,906	11,238	10,692	10,700 e	5,635 4
Hot-rolled products	do.	11,274	12,761 r	11,450 r	11,792 r	6,000
Lead, refined, secondary		63,400	62,330 r	63,454 r	80,966 r	80,900
Selenium[e]		200	200	200	200	200
Tin, metal, secondary including alloys		7,800	7,600	8,400	9,200 e	9,200
Zinc:						
Slab:						
Primary		222,000	219,800	241,300	239,000 e	239,000
Secondary, possibly remelted zinc		40,000	40,000	40,000 e	40,000 e	40,000
Total		262,000	259,800	281,300	279,000 e	279,000
Powder[e]		20,000	20,000	20,000	20,000	20,000
Industrial minerals:						
Barite[e]		27	28	28	28	28
Cement	thousand metric tons	7,594	8,192	9,571	9,500 e	9,500
Clay, kaolin[e]	do.	460	460	460	460	460
Lime and dead-burned dolomite, quicklime[e]	do.	2,300	2,400	2,400	2,400	2,400
Nitrogen, N content of ammonia	do.	890	825	830	830 e	830
Sodium sulfate[e]	do.	250	250	250	250	250
Stone:						
Worked[e]		21,188 4	18,798 4	19,000	19,000	19,000
Natural (excluding slate)[e]		460,206 4	336,584 4	340,000	340,000	340,000
Sulfur:						
Byproducts:[e]						
Elemental		225,000	225,000	225,000	225,000	225,000
Other forms		175,000	175,000	175,000	175,000	175,000
Total		400,000	400,000	400,000	400,000	400,000
Sulfuric acid	thousand metric tons	1,332	1,393	1,400 e	1,400 e	1,400
Mineral fuels and related materials:						
Carbon black[e]	do.	1,000	1,000	1,000	1,000	1,000
Coke, all types	do.	2,856 r	2,895	2,607	2,309 r	2,300
Gas, manufactured	thousand cubic meters	472,478	425,504	463,659	463,000 e	463,000
Petroleum refinery products:[5]						
Liquefied petroleum gas	thousand 42-gallon barrels	5,337 r	4,746 r	5,370 r	5,946 r	5,900
Naphtha and white spirit	do.	14,531	11,158	14,356	14,300 e	14,300
Gasoline	do.	50,562	53,570	42,664 r	34,257 r	34,200
Kerosene	do.	13,005	13,512	13,806 r	14,758 r	14,700
Kerosene, other	do.	500	340 r	261 r	283 r	280
Distillate fuel oil	do.	89,056	94,443	95,815 r	96,425 r	96,400
Refinery gas	do.	3,682	3,864	3,874	3,800 e	3,800
Residual fuel oil	do.	53,563	47,472	49,227	43,701 r	43,700
Bitumen	do.	6,523	8,520	8,635	8,600 e	8,600
Total	do.	236,759 r	237,625 r	234,008 r	222,070 r	222,000

See footnotes at end of table.

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TABLE 1—Continued

BELGIUM AND LUXEMBOURG: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Country and commodity		2005	2006	2007	2008	2009[e]
LUXEMBOURG						
Metals, steel:						
Crude	thousand metric tons	2,194	2,802	2,858	2,582 [r]	2,215 [4]
Hot-rolled products	do.	2,564	3,176 [r]	3,214 [r]	2,837 [r]	2,800
Industrial minerals:						
Cement, hydraulic[e]		700,000	700,000	700,000	700,000	700,000
Phosphates, Thomas slag:[e]						
Gross weight		475,000	475,000	475,000	475,000	475,000
P_2O_5 content		70,000	70,000	70,000	70,000	70,000

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. do. Ditto. -- Zero.

[1]Table includes data available through January 31, 2010.

[2]In addition to the commodities listed, Belgium produced a number of other metals and alloys, for which only aggregate output figures were available.

[3]Production reported by N.V. Umicore S.A. includes production from China and South Africa.

[4]Reported figure.

[5]Conversion factors from metric tons to 42-gallon barrels for petroleum refinery products are as follows: liquefied petroleum gas—11.6; naphtha and white spirit—8.5; gasoline—10; kerosene—7.75; distillate fuel oil—7.46; refinery gas—8.04; residual fuel oil—6.66; and bitumen—6.06.

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TABLE 2
BELGIUM AND LUXEMBOURG: STRUCTURE OF THE MINERAL INDUSTRIES IN 2009

(Thousand metric tons unless otherwise specified)

Country and commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
BELGIUM				
Cadmium, metal	metric tons	N.V. Umicore S.A.	Balen	1,800
Cement		Major companies:	Plants:	8,400
Do.		Cimenteries CBR SA (Heidelberg Cement Group)	Major plants at Lixhe, Mons/Obourg, Harmignies, Marchienne, and Ghent	(3,200)
Do.		Ciments d'Obourg SA (Holcim Group)	Plants at Obourg and Thieu	(2,800) [1]
Do.		Compagnie des Ciment Belge (Ciments Francais S.A.)	Plant at Gaurain-Ramecroix	(2,400)
Cobalt	metric tons	N.V. Umicore S.A.	Refinery at Olen	500
Copper		Metallo-Chimique NV (Metallum Group)	Smelter at Beerse	80
Dolomite		SA Dolomeuse (Group Lhoist)	Quarry at Marche les Dames	500
Do.		do.	Plant at Marche les Dames	750
Do.		SA de Marche-les-Dames (Group Lhoist)	Quarries at Nameche	3,000
Do.		do.	Plant at Nameche	3,000
Do.		SA Dolomies de Merlemont (Group Lhoist)	Quarry at Philippeville	100
Lead, metal		N.V. Umicore S.A.	Smelter at Antwerp-Hoboken	90
Do.		do.	Refinery at Antwerp-Hoboken	125
Do.		Nyrstar NV [2]	Smelter at Balen/Overpek	450
Limestone		Carmeuse S.A. (Long View Investment NV)	Mines and plant at Engis	1,850
Do.		do.	Mines and plant at Frasnes	450
Do.		do.	Mines and plant at Maizeret	850
Do.		do.	Mines and plant at Moha	800
Do.		SA Transcar (Royal Volker Stevin)	Mines and plant at Maizeret	850
Petroleum, refined	42-gallon barrels per day	Companies:	Refineries, of which:	
		Total S.A.	Refinery at Antwerp	268,000
Do.	do.	Esso S.A.NV	do.	239,000
Do.	do.	Antwerp Processing Co. (Vitol Group)	do.	125,000
Do.	do.	Belgian Refining Corp. (Petroplus AG)	do.	107,500
Do.	do.	PRA NV (Vitol Group)	do.	22,300
Salt		Zoutman NV	Plant at Roeselare	200
Sand, silica		SRC-Sibelco SA	Mines and plants at Lommel, Mol, and Maasmechelen	500
Steel		Companies:	Of which:	14,000
Do.		ArcelorMittal Liege (ArcelorMittal)	Plant at Liege	3,000
Do.		Carsid S.A. (Duferco SIF S.A. NV)	Plant at Charleroi	2,000
Do.		ArcelorMittal Gent (ArcelorMittal)	Plant at Ghent	3,000
Do.		Duferco La Louviere S.A. (Duferco SIF S.A. NV)	Plant at La Louviere	2,400
Do.		Duferco Clabecq S.A. (Duferco SIF S.A. NV)	Plant at Clabecq	750
Do.		Industeel Belgium S.A. (ArcelorMittal)	Plant at Charleroi	600
Do.		ArcelorMittal Genk (ArcelorMittal)	Plant at Genk-Zuid	360
Do.		Tubemeuse Industries S.A. (Umran Steel Pipe Inc.)	Plant at Flemalle	50
Tin		Metallo-Chimique NV (Metallum Group)	Smelter at Beerse	500
Zinc, metal		Nyrstar NV	Smelter and refinery at Balen/Overpek	450
LUXEMBOURG				
Cement		Cimalux S.A. (Dyckerhoff AG).	Plant at Esch-sur-Alzette	850
Do.		Cimalux Intermoselle SARL (Dyckerhoff AG)	Plant at Rumelange	1,000
Steel		Acieries Reunies de Burbach-Eich-Dudelang (ArcelorMittal)	Plants at Differdange, Dudelange, Esch-Belval, Esch-Schifflange	5,320
Do.		Arcelor Differdange SA (ArcelorMittal)	Plant at Differdange	1,200
Do.		Ugine & ALZ Carnox (ArcelorMittal)	do.	1,000

Do., do. Ditto.

[1]Includes the capacity of the company SA Ciments de Haccourt.

[2]Company publicly traded with the following participation: Blackrock Group, 10.31%; Glencore, 7.79%; and N.V. Umicore S.A., 5.25%.

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The Mineral Industry of Bosnia and Herzegovina

By Mark Brininstool

Bosnia and Herzegovina was not a major world or regional producer of minerals or mineral products. Aluminum, coal, petroleum products, and steel were the most significant mineral products in the country in terms of their production value and the number of people employed in producing them.

Minerals in the National Economy

Bosnia and Herzegovina's gross domestic product (GDP) decreased in real terms by 2.9% compared with the GDP in 2008. The value of mining and quarrying output decreased by about 8% and accounted for only about 2% of the GDP. Manufactured basic metals made up about 13.7% of the value of exports and was the single largest export category; mining and quarrying made up about 1.9% of the value of exports. Imports of petroleum and natural gas made up 6.5% of the value of all imports, and imports of coke and refined petroleum products, about 6.1% (Agency for Statistics of Bosnia and Herzegovina, 2010a, p. 6-7; b, p. 1, 7).

Production

In 2009, significant decreases in production took place for most mineral commodities in Bosnia and Herzegovina compared with production in 2008. Production decreases were mainly the result of lower demand for mineral commodities owing to the world economic crisis. Also, in January, some mineral production facilities were forced to suspend operations for a short period of time when supplies of natural gas were halted owing to the dispute between Russia and Ukraine over gas payments and the resulting suspension of natural gas transit through Ukraine. The natural gas crisis had only a small effect compared with that of general economic conditions, however. Bauxite production decreased by 45%; lead ores and concentrate, by 37%; alumina, by 35%; ferroalloys and zinc ores and concentrate, by 28% each; aluminum, by 22%; and crude steel, by 15%. Production of barite, bentonite, dolomite, graphite, gypsum and anhydrite, kaolin, and some categories of dimension stones decreased by more than 40% each, and production of cement, crushed stone, gravel, granite, limestone, and silica sand decreased by more than 20% each. Production of refined petroleum products increased by 866% and production of pig iron increased by 99% as production facilities for these two products operated for their first full year after restarting production in 2008 (table 1; Mudeva and Tanner, 2009).

Structure of the Mineral Industry

Table 2 is a list of the major mineral industry facilities.

Commodity Review

Metals

Bauxite and Alumina and Aluminum.—In 2009, production of aluminum declined significantly owing to the drop in demand for metals as a result of the world economic crisis. In 2007, a consortium led by Glencore International AG of Switzerland was selected as the winning bidder for the 88% share of primary aluminum producer Aluminij d.d. Mostar (Aluminij) that was one-half owned by the Government of Bosnia and Herzegovina and one-half owned by Aluminij. Throughout 2009, the sale of the shares continued to be delayed by the consortium's condition that the Government guarantee a reduced rate for the supply of electricity, and the sale was still being negotiated at yearend (Zuvela, 2010).

Iron and Steel.—Production data for iron ore in table 1 have been significantly revised. In previous reports, iron ore production for the years 2005 through 2007 represented both nonagglomerated iron ores and agglomerated iron ores produced from the nonagglomerated iron ores, which resulted in double counting of iron ore products produced. Production data for years before 2005 did not have this problem. The production series in this report shows only nonagglomerated iron ores.

The iron and steel industry in Bosnia and Herzegovina was negatively affected by the world economic crisis and the resulting reduction in demand for steel products. In the beginning of April, iron ore miner ArcelorMittal Prijedor announced that it would suspend all its 700 employees at 55% of their regular pay and ArcelorMittal Zenica announced that it would suspend 40% of its 3,850 employees. Iron ore production reported by the Government did not decrease significantly, so ArcelorMittal Prijedor may have decided not to suspend operations, but information was not available to confirm the company's final decision. The doubling of pig iron production was a result of the first full year of production at ArcelorMittal Zenica's blast furnace after it restarted operations in July 2008 (Sagolj and Sito-Sucic, 2009; ArcelorMittal S.A., 2010).

Mineral Fuels

Production of petroleum refinery products increased by almost 10 times because the reconstructed oil refinery Bosanski Brod operated for its first full year after restarting production on November 27, 2008, following nearly 3 years of inactivity. Russian state-owned company JSC Zarubezhneft had purchased the Bosanski Brod refinery in February 2007 and invested approximately $60 million[1] to restart production. The crude

[1]Where necessary, values have been converted from European Union euros (€) to U.S. dollars (US$) at the rate of €0.68=US$1.00.

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oil processing capacity was initially 1.2 million metric tons per year (Mt/yr), and Zarubezhneft intended to make further investments to increase the processing capacity to 4.2 Mt/yr (JSC Zarubezhneft, 2008).

Outlook

Bosnia and Herzegovina's mineral industry will probably continue to be a relatively small producer of minerals and mineral products, and aluminum, steel, and petroleum products are expected to remain important export products for the country. Increases in the production of mineral commodities will most likely depend on the recovery of the world economy.

References Cited

Agency for Statistics of Bosnia and Herzegovina, 2010a, Exports and imports according to statistical procedures, I-XII 2009: Sarajevo, Bosnia and Herzegovina, Agency for Statistics of Bosnia and Herzegovina, no. 12, January 26, 30 p.

Agency for Statistics of Bosnia and Herzegovina, 2010b, Gross domestic products of Bosnia and Herzegovina 2009—Production approach—First results: Sarajevo, Bosnia and Herzegovina, Agency for Statistics of Bosnia and Herzegovina, no. 1, July 20, 7 p.

ArcelorMittal S.A., 2010, ArcelorMittal Zenica: ArcelorMittal S.A. (Accessed September 14, 2010, at http://www.arcelormittal.com/index.php?lang=en&page=743.)

JSC Zarubezhneft, 2008, 27th of November 2008, Bosnia and Herzegovina greeted the launch of oil refinery Bosanski Brod; reconstructed by JSC "Zarubezhneft"—The first line of production is fully operational: JSC Zarubezhneft press release, November 28. (Accessed December 31, 2008, at http://www.zarubezhneft.ru/www/nestroweb.nsf/2fc4c60e9fdaaa5fc3256a70004302f7/7635805f4082082ec325750f0040e164?OpenDocument.)

Mudeva, Anna, and Tanner, Adam, 2009, Update 2—Firms close, thousands lose heating in Balkans: Thompson Reuters, January 8. (Accessed September 4, 2009, at http://www.reuters.com/article/OILPRD/idUSL84641920090108?pageNumber=2&virtualBrandChannel=0.)

Sagolj, Damir, and Sito-Sucic, Daria, 2009, ArcelorMittal Bosnia iron mine suspends 700 workers: Thompson Reuters, April 2. (Accessed April 6, 2009, at http://www.reuters.com/article/rbssSteel/idUSL234083020090402.)

Zuvela, Maja, 2010, Bosnia's Aluminij sees better 2010 after tough year: Thompson Reuters, January 11. (Accessed April 5, 2010, at http://www.reuters.com/article/idUSLDE60B0I120100112.)

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TABLE 1

BOSNIA AND HERZEGOVINA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007	2008	2009
METALS						
Alumina		447,260	393,580	303,799	294,455	191,792
Aluminum:						
Primary		120,000	121,000	121,750	123,000	96,000
Unwrought aluminum, including alloys		131,232	136,190	147,193	155,903	130,042
Bauxite		1,031,618	854,047	866,933	1,018,333	555,820
Iron and steel:						
Ore and concentrate:						
Gross weight		1,670,697 r	1,888,091 r	1,613,963 r	1,481,730 r	1,614,890
Fe content[e]		702,000 r	793,000 r	678,000 r	622,000 r	678,000
Metal:						
Ferroalloys, ferrosilicon		15,000 e	14,747	13,305	14,216	10,290
Pig iron[e]		-- r	-- r	-- r	243,000 [3]	482,469 [3]
Crude steel		289,000	490,000	533,000	608,000	519,000
Lead:						
Ores and concentrate, gross weight		2,309	1,152	4,677	6,029	3,781
Pb content[e]		1,300	600	2,600	3,300	2,100
Metal, smelter, secondary		79	33	1	46	35
Zinc:						
Ores and concentrate, gross weight		4,759	902	4,799	8,595	6,228
Zn content[e]		2,600 r	500 r	2,600 r	4,700 r	3,400
INDUSTRIAL MINERALS						
Barite		160	190	37	54	30
Cement		1,025,540	1,226,319	1,283,357	1,406,373	1,073,762
Clays:						
Bentonite		24,882	24,645	32,912	30,504	16,042
Ceramic clay, crude[e]		14,553 [3]	15,000	15,000	15,000	15,000
Kaolin, crude		14,500	69,643	188,033	259,325	148,384
Dolomite, crude		128,639	109,693	154,518	134,991	69,705
Graphite		--	387,838	393,762	272,084	133,819
Gypsum and anhydrite		152,939	131,936	154,294	150,039	74,302
Lime		186,000	218,121	237,190	215,787	280,939
Nitrogen, N content of ammonia[e]		500	500	500	500	500
Salt, all sources		392,240	416,305	502,487	555,122	556,089
Sand and gravel:						
Gravel		1,471,857	1,593,553	1,790,913	1,475,433	938,253
Sand, construction		574,490	20,835	98,267	175,527	156,128
Silica sand		119,831	711,399	671,336	702,018	501,175
Sodium compounds:						
Caustic soda[e]		11,424 [3]	12,156 [3]	12,200	12,200	12,000
Sodium bicarbonate		9,616	9,288	13,287	19,441	21,944
Stone:						
Dimension:						
Marble and travertine		2,552	2,664	6,049	5,785	6,358
Ecaussine and other calcareous stone		88,364	145,666	96,943	181,493	64,186
Granite		18,181	20,741	24,512	23,764	18,755
Porphyry, basalt and other stone		27,709	12,196	188,822	188,410	95,498
Slate		3,092	5,735	2,572	2,181	3,561
Crushed		3,049,920	3,035,727	2,901,891	4,370,598	3,444,518
Limestone, crushed and powdered		1,343,896	1,724,879	1,639,430	2,403,270	1,829,989
MINERAL FUELS AND RELATED MATERIALS						
Brown coal and lignite	thousand metric tons	9,144	9,965	9,765	11,244	11,515
Coke		456,221	468,443	592,471	576,785	609,377
Petroleum refinery products[e, 4]	42-gallon barrels	878,000	86,400	91,000	853,000 r	8,240,000

[e]Estimated; estimated data are rounded to no more than three significant digits. [r]Revised. -- Zero.

[1]Table includes data available through September 30, 2010.

[2]In addition to commodities listed, calcined gypsum, common clay, magnesite, manganese ore, soda ash, and steel semimanufactures may have been produced, but available information is inadequate to make reliable estimates of output.

[3]Reported figure.

[4]Figures were converted to barrels from production in metric tons, which was reported as the following: 2005—109,782; 2006—10,797; 2007—11,379; 2008—106,568 (revised); and 2009—1,029,585.

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TABLE 2
BOSNIA AND HERZEGOVINA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Alumina	Alumina Factory Birac a.d. (Ukio Banco Investment Group)	Plant at Zvornik	600
Aluminum	Aluminij d.d. Mostar	Smelter at Mostar	135
Bauxite	A.D. Boksit Milici	Mine at Milici, west of Srebrenica	NA
Do.	Rudnici Boksita Jajce d.d.	Mine at Jajce	NA
Cement	Tvornica Cementa Kakanj d.d. (Heidelberg)	Plant at Kakanj	NA
Do.	Fabrika Cementa Lukavac, d.o.o.	Plant in Lukavac	NA
Coal:			
Brown	RMU Banovici	Opencast mines at Cubric, Grivice, and Turija; underground mines at Omazici and Separacija	NA
Do.	Zenica Group	Stara Jama, Raspotocje, and Stranjani Mines at Zenica	NA
Do.	Durdevik Group	Potocari and Visca II opencast mines and Durdevik underground mine south of Zivinice	NA
Do.	Kakanj Group	Vrtliste opencast mine at Kakanj	NA
Do.	do.	Haljinic underground mine about 5 kilometers southeast of Kakanj	NA
Do.	Breza Group	Sretno and Kamenice underground mines 20 kilometers northwest of Sarajevo	NA
Do.	Abid Lolic Group	Grahovcici underground mine 10 kilometers west of Zenica	NA
Do.	Tusnica Mine	Drage opencast mine at Livno	NA
Do.	Elektrokrajina a.d.	Opencast mine at Ugljevik	NA
Lignite	Kreka Group	Opencast mine at Dubrave	NA
Do.	do.	Opencast mine at Sikulje	NA
Do.	do.	Underground mines at Mramor, about 5 kilometers northeast of Lukavac, and Bukinje, located between Tuzla and Lukavac	NA
Do.	EFT Rudnik I Termoelektrana Stanari d.o.o. (EFT Group)	Stanari opencast mine 20 kilometers west of Doboj	NA
Do.	Elektrokrajina a.d.	Opencast mine at Gacko	NA
Do.	Gracanica Group	Dimnjace opencast mine at Gornji Vakuf-Uskoplje	NA
Do.	Tusnica Mine	Opencast mine at Livno	NA
Coke	Global Ispat Koksa Industrija doo Lukavac	Lukavac	700
Do.	ArcelorMittal Zenica (ArcelorMittal S.A., 92%)	Plant at Zenica	680
Ferroalloys, ferrosilicon	Elektrobosna, Elektrohemijska i Eletrotermijska Industrija	Plant at Jajce	NA
Do.	B.S.I. d.o.o. (Metalleghe S.p.a.)	do.	15
Iron ore	ArcelorMittal Prijedor (ArcelorMittal S.A., 51%)	Jezero and Buvac open pit mines at Ljubija	NA
Lead-zinc ore	NA	Mine and mill at Srebrenica	NA
Manganese ore	Rudnik Mangana Buzim (LM IMPEX)	Mine and concentrator at Buzim	NA
Petroleum, refined	Bosanski Brod refinery (JSC Zarubezhneft)	Oil refinery at Bosanski Brod	1,200
Do.	do.	Oil refinery at Modrica	NA
Pig iron	ArcelorMittal Zenica (ArcelorMittal S.A., 92%)	Blast furnace at Zenica	NA
Salt, rock	Hemijski Kombinat "Sodaso," Rudnik Soli i Solni Bunari	Mines at Tusanj	NA
Do.	do.	Production from brine at Tuzla	NA
Steel, crude	ArcelorMittal Zenica (ArcelorMittal S.A., 92%)	Plant at Zenica	1,000
Steel, crude, secondary	Jelsingrad Livar Steel Foundry a.d.	Banja Luka	NA

Do., do. Ditto. NA Not available.

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The Mineral Industry of Bulgaria

By Mark Brininstool

Bulgaria's mineral industry included mine output of metal ores, mineral fuels (mainly coal), and a variety of industrial minerals. Additionally, the metallurgical sector smelted and refined copper, lead, silver, steel, and zinc. On a world scale, however, Bulgaria's mineral industry was small and mainly of regional importance. Bulgaria had the potential to become a relatively important natural gas transit country because the planned South Stream and Nabucco pipelines were to pass through the country.

Minerals in the National Economy

In 2009, Bulgaria's gross domestic product (GDP) decreased by about 5% compared with the country's GDP in 2008, and the total value of industrial production decreased by about 8% and accounted for about 17% of the total GDP. In 2007 (the latest year for which data were available), mining and quarrying activities made up 4.4% of the value of industrial production. In 2008 (the latest year for which data were available), about 29,600 people were employed in mining and quarrying (National Statistical Institute of the Republic of Bulgaria, 2008, p. 114; 2010a, b).

Production

Refined copper production increased by 55% compared with that of 2008, and zinc mine output increased by 20%. Crude steel production declined by 45% and refined zinc production decreased by 14%. No pig iron was produced in 2009. Production of most industrial minerals was estimated to have decreased significantly in 2009 owing to difficult economic conditions and decreased construction activities, which affected demand for industrial minerals, such as cement (cement consumption decreased by 37% compared with consumption in 2008). Natural gas production decreased by 95% because production stopped in January (Italcementi Group, 2010a, p. 50).

Structure of the Mineral Industry

Table 2 is a list of major mineral industry facilities.

Commodity Review

Metals

Copper.—In 2008, Norddeutsche Affinerie AG of Germany merged with the Cumerio Group (the owner of Bulgaria's sole copper smelter and refinery at Pirdop), and on April 1, 2009, the company changed its name to Aurubis AG and the name of the Cumerio Med S.A. copper refinery at Pirdop to Aurubis Bulgaria AD. Refined copper production at Pirdop increased significantly owing to a new tankhouse that was completed in 2008. The tankhouse reached its original designed capacity of 180,000 metric tons per year (t/yr) in October 2008, but production capacity increased to 200,000 t/yr by the end of 2008 owing to improvements in the production process (Aurubis AG, 2009a, p. 66; b).

After it obtained its final construction permits, Dundee Precious Metals Inc. of Canada began construction to expand its mine and mill at Chelopech to increase production capacity to about 150,000 t/yr of copper concentrate and 140,000 troy ounces per year of gold in concentrate by 2012. All Chelopech Mine's copper concentrate was to be supplied to Dundee's Tsumeb smelter in Namibia, but the company also had plans to build a metal processing plant to produce copper cathodes and gold doré in Chelopech. The Bulgarian Ministry of Environment and Water (MoEW) issued Dundee the necessary environmental permits for the project in September, but in November, the Bulgarian Supreme Administrative Court rejected these permits and ruled that the project should undergo another review by the MoEW (Dundee Precious Metals Inc., 2010, p. 3, 5, 28).

Gold.—In 2009, International Resource Holdings Ltd. of Australia acquired Clean Global Energy Pty Ltd. of Australia and renamed the merged companies Clean Global Energy Ltd. In October. Euromax Resources Ltd. of Canada purchased the two gold exploration projects in Bulgaria owned by Clean Global Energy Ltd.'s subsidiary, Thrace Resources EOOD. The Breznik project was the most significant project purchased from Thrace Resources and was reported by Euromax to have Joint Ore Reserves Committee (JORC)-compliant indicated resources of about 1 million metric tons (Mt) grading 2.01 grams per metric ton (g/t) gold and 6.05 g/t silver and inferred resources of 689,000 metric tons (t) grading 1.79 g/t gold and 5.66 g/t silver (Euromax Resources Ltd., 2010, p. 4, 8).

Besides working to expand its Chelopech project as discussed in the copper section above, Dundee also submitted an application to turn its Krumovgrad exploration concession into a mining concession. According to Dundee, the Krumovgrad deposit had NI 43-101-compliant proven and probable reserves of about 4.86 Mt of ore, with 5.08 g/t of gold. No date was given as to when mining could potentially begin, but the company hoped to have a more detailed assessment prepared in 2010. Cambridge Mineral Resources plc of the United Kingdom had two exploration projects in Bulgaria and reported a JORC-compliant indicated resource of 15.8 Mt of ore grading 0.85 g/t gold at its Tashlaka Hill project, and indicated resources based on the Russian system of resource classification of 6.74 Mt grading 2.11 g/t gold at its Chaira project (Cambridge Mineral Resources plc, 2010; Dundee Precious Metals Inc., 2010, p. 31-32)

Iron and Steel.—No ferroalloys or pig iron was produced in Bulgaria, and production of crude steel decreased significantly in 2009 because Kremikovtzi AD's production capacity was shut down in late 2008. Bulgaria's only other producer of crude steel, Stomana Industry S.A., reduced production owing to

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the world financial crisis and the resulting reduction in steel demand. The Bulgarian Government continued to try to sell Kremikovtzi AD, which was declared insolvent in 2008, but in February, Smart Holding of Ukraine ended talks concerning the purchase of the plant and in March, Companhia Siderugica Nacional of Brazil withdrew its interest in purchasing the plant. Gas supplies to Kremikovtzi were stopped on May 15 owing to unpaid debts and signaled the end to any hope that the plant would restart production. By the end of the year, investors chose not to approve plans to restart the insolvent company and it seemed likely that the plant, which had previously employed about 5,000 people, would be liquidated in 2010. Promet Steel JSC was removed from the list of steel producers in table 2 because it is now believed that Promet was a producer only of steel products, not of crude steel (Ivanova and Zawadzki, 2009; Kostadinov, 2009b; Ledwith, ed., 2009; Sofia News Agency, 2009a, c).

Lead and Zinc.—Production of refined lead and zinc both decreased in 2009 as demand for metals declined owing to the world economic crisis. Lead and Zinc Complex Plc. (LZC) planned to release 150 employees in 2009. In October, LZC obtained a permit that would allow it to begin work on a modernization plan to increase zinc production capacity by 40% and enable it to meet EU environmental standards. The project was expected to be completed by 2012. In 2009, Bulgaria reduced its imports of lead content of ores and concentrates to 38,000 t from 72,000 t in 2008, and reduced its exports of refined lead to 76,000 t in 2009 from 80,000 t in 2008. Bulgaria imported 73,000 t of zinc content of ores and concentrates, which was the same amount as in 2008, and reduced exports of refined zinc to 87,000 t from 94,000 t in 2008 (Sofia News Agency, 2009b; International Lead and Zinc Study Group, 2010, p. 12-13, 44-45).

Industrial Minerals

Cement.—Cement production was estimated to have fallen significantly as cement consumption in Bulgaria decreased by 37% in 2009 compared with consumption in 2008 owing to the reduction of construction projects as a result of the world financial crisis. Because of the lack of demand for cement, Holcim Bulgaria AD (a subsidiary of Holcim Ltd. of Switzerland) temporarily stopped producing cement clinker at its cement plant at Pleven and instead used the plant to grind clinker produced by the plant at Beli Izvor. Italcementi Group of Italy planned to expand its cement production capacity at Devnya Cement to 2.7 Mt/yr from 2 Mt/yr but postponed work on the project for 1 year, presumably because of the lack of available financing owing to the world financial crisis. No estimated date for the completion of the project was given (Holcim Ltd., 2010, p. 56; Italcementi Group, 2010a, p. 50, 61; b).

Mineral Fuels and Related Materials

Coal.—Bulgaria's main producer of coal was Mini Maritsa Iztok EAD, which accounted for about 95% of lignite production in Bulgaria. Economic Mining and Power Combine (SMEK) Balkanbass was removed from the list of bituminous coal producers in table 2. No information was available as to when SMEK Balkanbass stopped production of coal, but Mina Balkan 2000 AD is the only reported producer of bituminous coal (Ministry of Economy, Energy, and Tourism, 2009, p. 11).

Coke.—No coke was produced in 2009 because the production capacity of Kremikovtzi AD (the country's only coke producer) was shut down in late 2008.

Natural Gas.—On January 31, Melrose Resouces S.a.r.l. stopped production at its Galata field in the Black Sea, which had been the only source of natural gas production in Bulgaria. The field was almost depleted, and Melrose planned to convert it into a gas storage facility that would have an eventual capacity of 1.2 billion cubic meters and potentially up to 1.8 billion cubic meters. The company was waiting for various approvals from the Government before continuing work on the project. In 2008, the Galata field provided about 6.5% of the gas consumed in Bulgaria; the other 93.5% was imported from Russia. Melrose had been exploring two offshore fields in the Black Sea and reported reserves of 1.4 billion cubic meters at the Kaliakra deposit and 0.7 billion cubic meters at the Kavarna deposit; it planned to begin producing about 1.3 million cubic meters per day from these two deposits in 2010 (Ministry of Economy, Energy, and Tourism, 2009, p. 6; Melrose Resources Plc., 2010, p. 14-16).

Bulgaria imported 3.43 billion cubic meters of natural gas in 2008 and 2.52 billion cubic meters in 2009. The reduced imports of gas were the result of reduced industrial use of gas and the January gas crisis, which started when Russia shut off supplies of gas to Ukraine because of payment disputes. Gas deliveries to Bulgaria were completely stopped from January 6 to January 20 during the gas crisis and cost Bulgaria about 180 million cubic meters of gas imports. The larger reason for reduced gas imports was most likely decreased industrial activity as production slowed owing to the world economic crisis (Kosturkov, 2009; National Statistical Institute of the Republic of Bulgaria, 2010c).

In May, Bulgarian Energy Holding EAD and OAO Gazprom of Russia signed an agreement that established the framework for a feasibility study of the South Stream natural gas pipeline's section through Bulgaria and the establishment of a joint venture to build and operate the pipeline. Following elections in July, a new center-right government took power in Bulgaria and announced that it wanted to reexamine energy deals made with Russia by the former Socialist Party-led government. In December, the Bulgarian Energy Ministry and Bulgaria Energy Holding EAD agreed to hold talks in January 2010 with Gazprom to discuss reestablishing terms for the continuation of the South Stream project in Bulgaria. The South Stream pipeline had a planned capacity of 63 billion cubic meters per year of natural gas to be transported from Russia to Europe through the Black Sea (Leviev-Sawyer, 2009; OAO Gazprom, 2009, 2010).

On July 13, Bulgaria, along with Austria, Hungary, Romania, and Turkey, signed an agreement that established the basic legal rules and tariff regulations for the Nabucco natural gas pipeline project. Nabucco was supported by the European Union and the United States and was designed to act as an alternative supply route for natural gas to Europe by transporting 31 billion cubic meters per year of gas from Central Asia and the Middle East. Supplies of natural gas for the pipeline were the biggest concern

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for the project because no source of gas had been guaranteed (Offshore, 2009).

Uranium.—No uranium was mined in Bulgaria and all the nuclear fuel required for the country's only nuclear powerplant (NPP) at Kozloduy was imported from TVEL Corp. of Russia. In October, RWE Power AG (RWE) of Germany announced that it would withdraw its participation in the construction of the 2,000-megawatt Belene NPP because it could not obtain a source of financing to cover its obligations. RWE also said that the project's failure to meet schedule targets to sign a construction contract and to establish a financial framework had also affected its decision. In December 2008, RWE and Bulgaria's Natsionalna Elektricheska Kompania (NEK) EAD had signed an agreement to give RWE a 49% stake in the Belene NPP; NEK would hold the remaining 51%. After the withdrawal of RWE from the project, NEK said that it would hire a consultant to develop new financing and development plans for the project, and NEK would potentially reduce its percentage of shares in the project to attract new investors. Critics claimed that the project could exceed planned costs and possibly cost up to 10 billion euros (TVEL Corp., 2006; Bulgarian Energy Holding EAD, 2009; Ivanova, 2009; Kostadinov, 2009a).

Outlook

The world economic crisis had a severe negative effect on Bulgaria's economy and mineral production. Improvements in the economic situation in Europe and renewed construction activity in Bulgaria could lead to increased production of mineral commodities in Bulgaria, but the country was expected to remain a modest producer in terms of world production.

References Cited

Aurubis AG, 2009a, Annual report 2008/09: Hamburg, Germany, Aurubis AG, 177 p.

Aurubis AG, 2009b, Norddeutsche Affinerie and Cumerio have become Aurubis—Renaming of public limited company (Aktiengesellschaft-AG) and subsidiaries has been carried out today: Aurubis AG press release, April 1. (Accessed April 2, 2009, at http://www.aurubis.com/en/public-relations/press-releases/norddeutsche-affinerie-and-cumerio-have-become-aurubis-renaming-of-public-limited-company-aktiengesellschaft-ag-and-subsidiaries-has-been-carried-out-today/.)

Bulgarian Energy Holding EAD, 2009, BEH announced plans to launch a procedure for selection of consultant for Belene NPP: Bulgarian Energy Holding EAD press release, December 12. (Accessed August 23, 2010, at http://www.bgenh.com/en/index.php?page=13&year=2009&month=12&nid=108.)

Cambridge Mineral Resources plc, 2010, Ore reserves and resources tabulation: Cambridge Mineral Resources plc. (Accessed August 20, 2010, at http://www.cambmin.co.uk/?i=projects.)

Dundee Precious Metals Inc., 2010, Annual report 2009: Toronto, Ontario, Canada, Dundee Precious Metals Inc., 79 p.

Euromax Resources Ltd., 2010, Annual report 2009: Vancouver, British Columbia, Canada, Euromax Resources Ltd., 48 p.

Holcim Ltd., 2010, Annual report 2009: Zurich, Switzerland, Holcim Ltd., 202 p.

International Lead and Zinc Study Group, 2010, Lead and zinc statistics—Monthly bulletin of the International Lead and Zinc Study Group: Lisbon, Portugal, International Lead and Zinc Study Group, v. 50, no. 7, July, 68 p.

Italcementi Group, 2010a, 2009 annual report: Bergamo, Italy, Italcementi Group, 225 p.

Italcementi Group, 2010b, Bulgaria: Italcementi Group. (Accessed August 20, 2010, at http://www.italcementigroup.com/ENG/Italcementi+Group/A+global+presence/Bulgaria/.)

Ivanova, Irina, 2009, UPDATE 2—RWE quits Bulgaria's nuclear project due to funding: Reuters, October 28. (Accessed January 12, 2010, at http://www.reuters.com/article/idUSLS68847920091028.)

Ivanova, Irina, and Zawadzki, Sabina, 2009, Smart Holding withdraws from Bulgaria steel talks: Thompson Reuters, February 25. (Accessed July 22, 2009, at http://in.reuters.com/article/rbssIndustryMaterialsUtilitiesNews/idINLP82451920090225.)

Kostadinov, Petar, 2009a, Germany's RWE pulls out of Bulgaria's Belene nuclear plant project: The Sofia Echo, October 28. (Accessed August 23, 2010, at http://sofiaecho.com/2009/10/28/806170_germanys-rwe-pulls-out-of-bulgarias-belene-nuclear-plant-project.)

Kostadinov, Petar, 2009b, Kremikovtzi cut off from natural gas supplies over unpaid debts: The Sofia Echo, May 15. (Accessed July 22, 2009, at http://sofiaecho.com/2009/05/15/719825_kremikovtzi-cut-off-from-natural-gas-supplies-over-unpaid-debts.)

Kosturkov, Kristian, 2009, Gas crisis costs Bulgaria 170 M Levs: Standart, January 21. (Accessed August 25, 2010, at http://paper.standartnews.com/en/article.php?d=2009-01-21&article=26436.)

Ledwith, Sara, ed., 2009, RPT—Feature—Foreign investors leave worried Bulgarians behind: Thompson Reuters, July 1. (Accessed August 18, 2010, at http://www.reuters.com/article/idUSLG37010920090701.)

Leviev-Sawyer, Clive, 2009, Bulgaria, Russia agree on new talks on gas, South Stream, and Belene: The Sofia Echo, December 24. (Accessed August 24, 2010, at http://sofiaecho.com/2009/12/24/835335_bulgaria-russia-agree-on-new-talks-on-gas-south-stream-and-belene.)

Melrose Resources Plc., 2010, Annual report and accounts 2009: Edinburgh, Scotland, Melrose Resources Plc., May, 76 p.

Ministry of Economy, Energy, and Tourism, 2009, Bulletin on the state and development of the energy in the Republic of Bulgaria: Ministry of Economy, Energy, and Tourism, March, 15 p. (Accessed August 23, 2010, at http://www.mee.government.bg/doc_vop/Bulletin[2].2009.EG.edited.pdf.)

National Statistical Institute of the Republic of Bulgaria, 2008, Statistical reference book of the Republic of Bulgaria 2008: Sofia, Bulgaria, National Statistical Institute of the Republic of Bulgaria, 193 p.

National Statistical Institute of the Republic of Bulgaria, 2010a, Employees under labour contract by economic activity groupings and sector in 2008: National Statistical Institute of the Republic of Bulgaria. (Accessed August 19, 2010, at http://www.nsi.bg/ORPDOCS/Labour_2.1.1_EN.xls.)

National Statistical Institute of the Republic of Bulgaria, 2010b, GDP by production approach—Total of economy: National Statistical Institute of the Republic of Bulgaria. (Accessed August 19, 2010, at http://www.nsi.bg/ORPDOCS/GDP_1.1.1_en.xls.)

National Statistical Institute of the Republic of Bulgaria, 2010c, Production and deliveries of natural gas: National Statistical Institute of the Republic of Bulgaria. (Accessed August 24, 2010, at http://www.nsi.bg/ORPDOCS/Energy-1.3.natural_gas_en.xls.)

OAO Gazprom, 2009, Gazprom and Bulgarian Energy Holding sign cooperation agreement in the framework of South Stream project implementation: OAO Gazprom press release, May 15. (Accessed October 21, 2009, at http://www.gazprom.com/press/news/2009/may/article64564/.)

OAO Gazprom, 2010, South Stream: OAO Gazprom. (Accessed August 24, 2010, at http://www.gazprom.com/production/projects/pipelines/south-stream/.)

Offshore, 2009, Nabucco transit countries sign intergovernmental agreement: Offshore, July 13. (Accessed August 24, 2010, at http://www.offshore-mag.com/index/article-display.articles.offshore.pipeline-transportation.middle-east.nabucco-transit_countries.QP129867.dcmp=rss.page=1.html.)

Sofia News Agency, 2009a, Brazil's CSN withdraws interest from Bulgarian Kremikovtzi: Sofia News Agency, March 31. (Accessed July 22, 2009, at http://www.novinite.com/view_news.php?id=102368.)

Sofia News Agency, 2009b, Bulgaria Lead and Zinc Complex JSC gets permit for new plant: Sofia News Agency, October 6. (Accessed October 7, 2009, at http://www.novinite.com/newsletter/print.php?id=108567.)

Sofia News Agency, 2009c, Bulgaria Ministers write off crippled steel giant Kremikovtzi: Sofia News Agency, November 11. (Accessed August 18, 2010, at http://www.novinite.com/view_news.php?id=109878.)

TVEL Corp., 2006, Delivery date of nuclear fuel supply to Kozloduy NPP (Bulgaria) extended till 2020: TVEL Corp. press release, March 9. (Accessed August 19, 2009, at http://www.tvel.ru/en/press/news/index.php?from4=15&id4=89.)

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TABLE 1

BULGARIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007	2008	2009
METALS						
Aluminum, metal, secondary		5,107	12,825	17,330	12,607 r	12,000 e
Cadmium, metal, smelter		350	363	459	460 e	420 e
Copper:						
Ore:						
Gross weight	thousand metric tons	24,807	29,572	29,674	27,826	27,800 e
Cu content e	do.	112	124	116	109	110 e
Concentrate:						
Gross weight	do.	470	502	502	428	430 e
Cu content	do.	95	110	110	105	105
Metal, primary and secondary:						
Smelter		240,000	238,500	229,100	278,200 r	276,200
Refined, electrolytically		60,500	65,500	69,900	126,700	196,900
Gold, in concentrate	kilograms	3,868	3,818	3,964	4,160	4,300 e
Iron and steel, metal:						
Pig iron for steelmaking	thousand metric tons	1,081	1,147	1,069	441	--
Ferroalloys e	do.	10	10	10	6 r, 3	--
Steel, crude	do.	1,969	2,124	1,909	1,330	726
Semimanufactures e	do.	1,452 3	1,400	1,400	1,287 r, 3	700
Lead:						
Mine output, Pb content		13,000	10,000	15,000	15,000	18,000
Concentrate:						
Gross weight		31,500	25,387	23,395	18,503	19,000 e
Pb content		22,050	17,771	16,377	12,950	13,000 e
Metal, refined, primary and secondary		80,824	76,028	86,956	90,878 r	83,000
Manganese ore:						
Gross weight		39,000	20,000	28,000	39,000	39,000 e
Mn content e		10,900	5,600	7,840	10,900	10,900
Silver, metal e	kilograms	55,000	65,000	55,000	55,000	55,000
Tin, metal, secondary e		10	10	2	2	1
Zinc:						
Mine output, Zn content		11,000	8,000	10,000	10,000	12,000
Concentrate:						
Gross weight		33,700	25,917	23,474	20,343	20,500 e
Zn content e		17,500	13,500	12,200	10,600	10,700
Metal, refined, primary and secondary		95,077	95,341	99,992	106,453 r	92,000
INDUSTRIAL MINERALS						
Barite ore, run-of-mine e		76,600	74,500	50,900	40,000	14,300
Cement, hydraulic	thousand metric tons	3,618	4,093	4,413	4,903 r	3,000 e
Clays:						
Bentonite	do.	181	134	99	178	160 e
Kaolin, raw	do.	1,381	1,658	1,631	1,530	1,400 e
Refractory e	do.	22 3	18 3	15	15	15
Feldspar e	do.	73 3	93 3	90 r	90	80
Fluorspar e	do.	2	2	2	2	2
Gypsum and anhydrite:						
Crude	do.	188	216	234	210 r	190 e
Calcined e	do.	65	75	75	75	70
Lime, industrial	do.	1,352	1,409	1,443	1,422 r	1,300 e
Limestone and dolomite	do.	3,265	3,340	3,335	3,340 e	3,100 e
Nitrogen, N content of ammonia e	do.	395	309	350	350 e	320 e
Perlite	do.	15	5	14	7	7 e
Pyrites, gross weight e	do.	150	150	150	150	150
Salt, all types	do.	1,900	2,000	2,000	2,100	1,900 e

See footnotes at end of table.

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TABLE 1—Continued
BULGARIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007	2008	2009
INDUSTRIAL MINERALS—Continued						
Sand and gravel:						
As reported	thousand cubic meters	3,628	4,293	4,925	5,517	5,000 e
Converted[e]	thousand metric tons	5,800	6,900	7,900	8,800	8,000 e
Silica, quartz sand	do.	583	250	551	734	650 e
Sodium carbonate, calcined[e]	do.	800	800	800	800	800 e
Sulfur:[e]						
S content of pyrites		25,000	25,000	25,000	25,000	25,000
Byproduct		300,000	300,000	300,000	300,000	300,000
Total		325,000	325,000	325,000	325,000	325,000
Sulfuric acid[e]		1,020,000 [3]	1,009,500 [3]	1,010,000	1,010,000	1,000,000
Zeolite[e]		15,000	15,000	15,000	15,000	15,000
MINERAL FUELS AND RELATED MATERIALS						
Coal, marketable:						
Bituminous	thousand metric tons	96	52	18	19	18 e
Brown	do.	2,620	2,557	2,834	2,643	2,500 e
Lignite	do.	22,193	22,750	25,325	26,008	24,700 e
Total	do.	24,909	25,359	28,177	28,670	27,218
Coke	do.	752 r	668 r	525 r	337 r	--
Natural gas, marketed	million cubic meters	537	519	295	218	12
Petroleum:[4]						
Crude	thousand 42-gallon barrels	198	183	176	169	176
Refinery products[e]	do.	47,800 r	54,600 r	54,400 r	54,500 r	50,000

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. do. Ditto. -- Zero.

[1]Table includes data available through August 25, 2010.

[2]In addition to the commodities listed, bismuth, chromite, magnesite, palladium, platinum, tellurium, and a variety of crude construction materials (common clays, dimension stone, and crushed stone) may be produced, but available information is inadequate to make reliable estimates of output.

[3]Reported figure.

[4]Figures were converted to barrels from production reported in thousand metric tons, which was reported as the following: Crude production: 2005—27; 2006—25; 2007—24; 2008—23; 2009—24. Petroleum products: 2005—5,971; 2006—6,829; 2007—6,806; 2008—6,812; and 2009—6,255.

TABLE 2
BULGARIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Bentonite, mine output	Bentonit AD (S&B Industrial Minerals AD)	Kardzhali	NA.
Cadmium	KCM S.A.	Plovdiv	300.
	Lead and Zinc Complex Plc. (LZC) (Intertrust Holding, 90%)	Kardzhali	150.[e]
Cement	Devnya Cement (Italcementi Group)	Devnya	2,000.
Do.	Vulkan Cement (Italcementi Group)	Dimitrovgrad	500.
Do.	Holcim Bulgaria AD (Holcim Ltd.)	Pleven Plant and Beli Izvor Plant	2,400.
Do.	Titan Zlatna Panega	Zlatna Panega	1,500.
Coal:			
Bituminous	Mina Balkan 2000 EAD	Central Bulgaria	NA.
Brown	Otkrit Vagledobiv Mines EAD	Pernik coal basin, southwest of Sofia	2,000.[e]
Do.	Vagledobiv Bobov Dol EOOD	Bobov Dol coalfield	1,000.[e]
Do.	Other small producers	Eastern and western Bulgaria	1,000.[e]
Lignite	Mini Maritsa Iztok EAD (State owned)	East Maritsa coal basin near Radnevo	25,000.[e]
Do.	Other small producers	Sofia, Pernik, and Bobov Dol coal basins	5,000.[e]

See footnotes at end of table.

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TABLE 2—Continued
BULGARIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities	Annual capacity
Coke	Kremikovtzi A.D.	About 10 kilometers northeast of Sofia	NA.
Copper:			
Concentrate, Cu content	Assarel-Medet JSC	Panagurishte, Pazardzhik District	57.
Do.	Ellatzite-Med AD	Mine 8 kilometers south of Etropole, concentrator near Mirkovo village	45.
Do.	Dundee Precious Metals Inc.	Chelopech	13.
Do.	Bradtze	Malko Turnovo	2.
Do.	Burgaskii Mines Ltd., Zidorovo	Burgas, near the Black Sea	1.
Metal:			
Smelter	Aurubis Bulgaria AD (Aurubis AG)	Pirdop	275.
Refinery	do.	do.	200.
Gold, in concentrate kilograms	Dundee Precious Metals Inc.	Chelopech	2,500.[e]
Do. do.	Ellatzite-Med AD	Mine 8 kilometers south of Etropole and concentrator near Mirkovo village	NA.
Iron ore	Kremikovtzi A.D.	About 10 kilometers northeast of Sofia	NA.
Kaolin, mine output	Kaolin AD	Senovo, Rousse District	NA.
Lead-zinc:			
Concentrate, Pb-Zn content	Gorubso Co. (Intertrust Holding)	Erma Reka, Kardzhali, Laki and Zlatograd, all in Madan area near Greek border	59 lead, 47 zinc.
Do.	Osogovo Ltd.	Osogovo Mountains, western Bulgaria	3 lead, 2 zinc.
Do.	Rudmetal JSC	Dimov Dol Mine, near Rudozem	3 lead, 2 zinc.
Metal:			
Pb, refined	KCM S.A.	Plovdiv	65.
Do.	Lead and Zinc Complex Plc. (LZC) (Intertrust Holding, 90%)	Kardzhali	33.
Zn, smelter	KCM S.A.	Plovdiv	75.
Do.	Lead and Zinc Complex Plc. (LZC) (Intertrust Holding, 90%)	Kardzhali	28.
Manganese ore	Obrochishte Mine (Euromangan AD)	Tsarkva village, 10 kilometers west of Balchik	NA.
Natural gas million cubic meters	Melrose Resources S.a r.l. (100%, Melrose Resources Plc.)	Galata field, in the Black Sea off the coast of Varna	NA.
Do. do.	Oil and Gas Exploration and Production Plc.	Gas field concessions near Dolni Dubnik, Selanovtzi, and others	NA.
Perlite, mine output	Bentonit AD (S&B Industrial Minerals AD)	Kardzali	NA.
Petroleum:			
Crude	Oil and Gas Exploration and Production Plc.	Tyulenovo, Dolni Dubnik, Dolni Lukovit, Gorni Dubnik, and other oil fields	NA.
Refined 42-gallon barrels per day	Lukoil Neftochim Bourgas AD	Refinery at Burgas	215,000.
Silver:			
In concentrate kilograms	Dundee Precious Metals Inc.	Chelopech	3,200.[e]
Metal	KCM S.A.	Plovdiv	100.
Steel, crude	Kremikovtzi A.D.	About 10 kilometers northeast of Sofia	NA.
Do.	Stomana Industry S.A. (Sidenor S.A., 100%)	Pernik	1,400.
Zeolite, mine output	S&B Industrial Minerals A.D.	Kardzali	15.[e]

Do., do. Ditto. [e]Estimated. NA Not available.

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THE MINERAL INDUSTRY OF CROATIA

By Mark Brininstool

Croatia produced a limited number of mineral commodities, none of which were produced in a quantity significant on a world scale. Petroleum extraction and refining were the major economic activities of the mineral industry; production of metals was limited to aluminum alloys and steel. In 2009, Croatia's gross domestic product (GDP) decreased by 5.8% compared with the GDP in 2008. In 2008 (the latest year for which data were available), Croatia imported about $3.5 billion of mining and quarrying goods and exported only about $375 million. Imports of crude oil and natural gas accounted for about $3.1 billion of the imports and made up about 10% of the value of all Croatian imports. Croatia is expected to remain a modest producer of mineral commodities, and mineral fuels are expected to remain the most important outputs of Croatia's mineral sector, although the country will most likely remain heavily dependent on imports of mineral fuels (Croatian Bureau of Statistics, 2009, p. 364; 2010, p. 45).

Production

Most reported mineral production declined in 2009 compared with that of 2008 as the world economic crisis in 2009 reduced demand from construction and manufacturing companies. Steel production decreased by 58% and Zeljezara Split d.d. reduced production of crude steel to 1,421 metric tons (t) in 2009 from 89,056 t in 2008. Zlomrex S.A. purchased Zeljezara Split d.d. at the end of 2007 and put the plant up for sale at the end of 2008 but had not yet found a buyer. Carbon black production decreased by 76%; gypsum and anhydrite, by 29%; lime, by 23%; and cement, by 22% (table 1; Zlomrex S.A., 2010, p. 4, 13).

Structure of the Mineral Industry

Table 2 is a list of major mineral industry facilities.

References Cited

Croatian Bureau of Statistics, 2009, Statistical yearbook 2009: Zagreb, Croatia, Croatian Bureau of Statistics, December, 754 p.

Croatian Bureau of Statistics, 2010, Statistical information 2010: Zagreb, Croatia, Croatian Bureau of Statistics, June, 93 p.

Zlomrex S.A., 2010, 2009 annual report and management discussion & analysis: Poraj, Poland, Zlomrex S.A., April 30, 17 p.

TABLE 1
CROATIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007	2008	2009[e]
METALS						
Aluminum:						
Alloys		30,000 [e]	31,573	32,703	31,582	30,000
Semimanufactures:						
Rolled		48,000 [e]	48,785	49,050	52,135	50,000
Extruded		6,500 [e]	6,670	6,953	6,287	6,000
Total		54,500 [e]	55,455	56,003	58,422	55,000
Steel:						
Crude, from electric furnaces		73,640	80,516	76,252	121,759 [r]	51,583 [3]
Semimanufactures, hot rolled[e]		58,000	60,000	75,000 [r]	121,000 [r]	51,000
INDUSTRIAL MINERALS						
Cement	thousand metric tons	3,481	3,598	3,587 [r]	3,637 [r]	2,838 [3]
Clays:						
Bentonite		17,391	16,410	19,578	19,759 [r]	19,000
Ceramic clay[e]		197,921 [3]	300,718 [3]	300,000	300,000	300,000
Gypsum and anhydrite, crude		196,133	170,351	334,962	329,649 [r]	234,300 [3]
Lime	thousand metric tons	250 [e]	260	572	541 [r]	415 [3]
Nitrogen, N content of ammonia[e]	do.	300 [r]	300 [r]	300 [r]	300 [r]	308
Pumice and related materials, volcanic tuff	do.	21	17	15	15 [e]	15
Salt, all sources		36,970	29,589	32,536	32,500 [e]	32,500
Sand and gravel, excluding glass sand		114,785	365,550	350,000	350,000 [e]	350,000
Silica sand (quartz, quartzite, glass sand)		130,888	139,730	147,855	150,000 [e]	150,000
Stone:[e]						
Crushed and brown	thousand metric tons	15,103 [3]	17,625 [3]	18,000	18,000	18,000
Dimension stone[e]		1,500,000	1,500,000	1,500,000	1,500,000	1,500,000
Sulfur, byproduct of petroleum[e]		7,500	7,500	7,500	9,819 [r]	10,315 [3]

See footnotes at end of table.

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TABLE 1—Continued
CROATIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007	2008	2009[e]
MINERAL FUELS AND RELATED MATERIALS						
Carbon black		18,412 [r]	26,265 [r]	23,724 [r]	16,903 [r]	3,976 [3]
Natural gas, gross production	million cubic meters	2,283	2,715	2,892	2,729 [r]	2,717 [3]
Petroleum:[e]						
Crude, gross weight, includes condensate[4]	thousand 42-gallon barrels	7,020 [r]	6,800	6,520 [r]	6,200 [r]	5,760
Refinery products[5]	do.	38,600	36,400 [r]	39,900 [r]	32,100 [r]	31,700

[e]Estimated; estimated data are rounded to no more than three significant digits. [r]Revised. do. Ditto.
[1]Table includes data available through December 6, 2010.
[2]In addition to commodities listed, common clay also was produced, but available information is inadequate to make reliable estimates of output.
[3]Reported figure.
[4]Figures were converted to barrels from production in thousand metric tons, which was reported as the following: 2005—946; 2006—917; 2007—879 (revised); 2008—835 (revised); and 2009—776.
[5]Figures were converted to barrels from production in thousand metric tons, which was reported as the following: 2005—5,141; 2006—4,865; 2007—5,321; 2008—4,196; and 2009—4,246.

TABLE 2
CROATIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum alloys and semimanufactures		Tvornica Lakih Metala (TLM) d.o.o. (Adrial d.o.o. Sibenik)	Sibenik	40 [e]
Do.		Top-Tvornica Olovni i Aluminijskih	Savska	NA
Cement		Cemex Hrvatska d.d. (CEMEX S.A.B. de C.V., 100%)	Plants at Kastel Sucurac, Solin, and Solin Majdan	2,400
Do.		Holcim (Hrvatska) d.o.o.	Plant at Koromacno	1,000
Do.		Istra Cement International d.d. (Part of CALUCEM Group)	Plant at Pula	NA
Do.		Tvornica Cementa Umag d.o.o.	Cement plant at Umag	350
Do.		Nasicecement d.d. (Nexe Grupa d.d.)	Nasice	1,000
Natural gas	million cubic meters	INA-Industrija Nafte d.d. Zagreb (INA)	Natural gasfields at Molve, offshore platforms in the Adriatic Sea, and other locations	3,000
Petroleum, crude	thousand 42-gallon barrels per day	do.	Oilfields at Struzec, Kalinovac, Zutica, Sandrovac, and other locations.	20 [e]
Petroleum, refined		do.	Refinery at Rijeka (Urinj)	3,500
Do.		do.	Refinery at Sisak	2,300
Salt		Solana Pag d.d.	Pag Island (marine salt)	NA
Steel, crude		CMC Sisak d.d. [Commercial Metals Co. (CMC)]	Plant at Sisak	80
Do.		Zeljezara Split d.d. (Zlomrex S.A., 94.8%)	Plant at Split	185

[e]Estimated. Do., do., Ditto. NA Not available.

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THE MINERAL INDUSTRY OF CYPRUS

By Harold R. Newman

There was a long history and strong culture of mining in Cyprus;[1] however, mining made only a small contribution (0.2%) to the national economy in 2009. The mineral resources of the island included asbestos, chromite, copper, gypsum, lime, sand and stone, and umber. Cyprus' mining law provides security of tenure and right of access to private land for exploration purposes.

The Mines Service of the Ministry of Agriculture, Natural Resources, and Environment administered mineral operations under the Mines and Quarries (Regulation) Law, chapter 270, 1959; the Mines and Quarries Regulations, 1958-79; and the Cyprus Standard and Control of Quality Law 1975. The Ministry's Geological Survey Department was responsible for the mineral exploration programs and the evaluation of the country's mineral resources.

In 2008 (the latest year for which data were available), the value of the mining and quarrying sectors increased by 14.3% compared with that of the previous year. It was estimated that the value added of the sector increased to euros (€) 59.7 million ($87.2 million)[2] in 2008 from €2.2 million ($76.2 million) in 2007 (Statistical Service of the Republic of Cyprus, 2009).

Cyprus' accession as a full member of the European Union (EU) on May 1, 2004, and its membership in the euro area became effective on January 1, 2008. On that day, the Government replaced the Cyprus pound (C£) with the euro. In 2009, the Cyprus pound could be exchanged only at the country's banks (U.S. Department of State, 2009).

International trade was important to the economy of Cyprus. On the production side, the lack of energy resources that the industry required for the production of heavy goods and the lack of raw materials necessitated the importation of these commodities. On the demand side, exports were vital to supply the aggregate demand for Cypriot agricultural production, manufactured products, and mineral commodities. The EU and the neighboring Middle Eastern countries absorbed the majority of Cyprus' exports (PriceWaterhouseCoopers, 2009).

U.S. exports to Cyprus in 2009 totaled $161 million and included drilling and oilfield equipment, $2,590,000; precious metals, $1,662,000; petroleum products, $1,621,000; iron and steel products, $258,000; and gem diamond, $36,000. U.S. imports from Cyprus totaled $53 million and included sulfur and nonmetallic minerals, $325,000, and materials handling equipment, $27,000. Mineral exports and imports were transmitted through the Ports of Larnaca, Limassol, and Vassiliki or through the petroleum products terminals at Dhekelia, Larnaca, and Moni (U.S. Census Bureau, 2009).

[1]Unless specifically stated, all data in this chapter are for the Republic of Cyprus in southern Cyprus because data related to areas of northern Cyprus administered by Turkish Cypriots are sparse or unavailable. The two areas have been separated since 1974.

[2]Where necessary, values have been converted from European Union euros (€) to U.S. dollars (US$) at a rate of €1.00=US$1.46.

Production

Data on mineral production are in table 1. Bentonite, cement, sand and gravel, and stone were the major mineral commodities produced by the mineral industry of Cyprus. Other mineral commodities produced included common clay for brick and cement manufacture, gypsum, ocher, and umber. Cement production decreased by 22.6% compared with production in 2008 (table 1).

Structure of the Mineral Industry

Table 2 is a list of major mineral industry facilities and their locations. All facilities were privately owned.

Commodity Review

Metals

Copper.—EMED Mining Public Ltd. completed a prefeasibility study on its Klirou copper-zinc property, which is located about 20 kilometers southwest of Nicosia. Using historic and recent drill hole data, EMED Mining estimated that the deposit contained inferred reserves of 4.5 million metric tons (Mt) of copper ore at a grade of 0.41% copper containing 18,500 metric tons (t) of contained copper and zinc ore at a grade of 0.74% zinc containing 33,400 t of contained zinc. The Klirou deposit extends from the surface to about 200 meters (m) below the surface and is potentially minable by open pit methods. EMED Mining planned to increase these resources by infill and step-out drilling. EMED Mining was exploring primarily for nonoutcropping volcanic massive sulfide (VMS) deposits largely within the Upper Pillow Lavas of the Troodos Complex (Siemens AE Greece, 2009).

Industrial Minerals

Cement.—Siemens AE Greece was awarded a contract to supply the electrical and automation equipment for a new kiln line and cement line at Vassiliko Cement Works Public Company Ltd. (VCW). An energy monitoring system integrated with the process control system would constantly monitor energy consumption at the plant. The cost was expected to be about $20 million, and the new line was expected to go onstream in January 2011. The new clinker production unit at Vassilikoill would have a production capacity of 2.4 million metric tons per year and would replace three existing lines in the plant. VCW was the only cement producer on Cyprus since the company's merger with Cyprus Cement Co. in 2007 (Siemens AE Greece, 2009).

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Mineral Fuels

Natural Gas and Petroleum.—Cyprus produced no natural gas or petroleum in 2009. The National Oil Corp. of Libya announced that it was interested in investing in natural gas and petroleum deposits off southern Cyprus and planned to participate in the next round of licensing there. The Government launched an initial licensing round in 2007 for 11 blocks covering 51,000 square kilometers and planned to hold a second licensing round in the near future. Also, Libya was interested in participating in a planned energy infrastructure project that would involve construction of a facility housing crude oil facilities and a liquefied natural gas regasification terminal (Watkins, 2009).

Outlook

In 2009, domestic industrial infrastructure construction is expected to continue to be the main source of domestic demand for cement, gypsum, sand and gravel, and stone. International demand is expected to continue to support Cypriot exports of bentonite, gypsum, perlite, and umber. The construction industry is expected to continue to be important to the economy. Natural gas and petroleum exploration is expected to continue.

References Cited

PriceWaterhouseCoopers, 2009, Foreign trade: PriceWaterhouseCoopers. (Accessed March 21, 2010, at http://info.industry.siemens.com/press/Details.aspx?pressArticleId=1890.)

Siemens AE Greece, 2009, Siemens supplies equipment for new kiln line and cement mill on Cyprus: Siemens AE Greece. (Accessed May 12, 2009, at http://www.pressreleasepoint.com/siemens-supplies-equipment-new-kiln-line-and-cement-mill-cyprus.)

Statistical Service of the Republic of Cyprus, 2009, Industrial statistics, 2008: Statistical Service of the Republic of Cyprus. (Accessed September 10, 2009, at http://www.mof.gov.cy/mof/cystat/statistics.nsf/ALL2D5A4D3DCE7347C3C22576190030.)

U.S. Census Bureau, 2009, Foreign trade statistics: U.S. Census Bureau. (Accessed March 11, 2010, at http://www.census.gov/foreign-trade/balance/c4910.html.)

U.S. Department of State, 2009, Background note—Cyprus: U.S. Department of State. (Accessed September 30, 2009, at http://www.state.gov/r/pa/ei/bgn/5376.htm.)

Watkins, Eric, 2009, Libya seeks to invest in exploration offshore Cyprus: Oil & Gas Journal, v. 107, issue 16, April 27, p. 29.

TABLE 1
CYPRUS: PRODUCTION OF MINERAL COMMODITIES[1]

(Thousand metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007	2008	2009[e]
Cement, hydraulic		1,805	1,786	1,873	2,211	1,481 [3]
Clays:						
Bentonite	metric tons	172,366	150,620	154,655	155,125	152,722 [3]
Other:						
For brick and tile manufacture		443	400 [e]	476	490	480
For cement manufacture		600	540	620	635	400 [3]
Total		1,043	940 [e]	1,096	1,125	880
Copper, refined	metric tons	--	880	3,012	2,986	3,000
Gypsum, crude[4]	do.	210,000	264,000	304,000	405,500	317,000
Lime, hydrated	do.	16,589	12,715	13,497	14,285	12,000 [3]
Sand and stone:						
Limestone, crushed (Havara)		1,000	700	875	766	800
Marble, granules and chippings	metric tons	200	100	800	550	400
Marl, for cement production		2,450	2,210	2,540	2,595 [3]	2,600
Sand and gravel[5]		12,064	12,199	13,129	14,174	15,000
Building stone[6]		51	57	38	71	60
Umber	metric tons	5,088	5,757	4,363	4,471	4,363 [3]

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. do. Ditto. -- Zero.

[1]Table includes data available through March 31, 2010.

[2]In addition to the commodities listed, small quantities of the mineral pigments ocher and terra verte are mined intermittently. Mineral production data from areas of northern Cyprus that are administered by Turkish Cypriots and the production of fertilizers, perlite, and secondary metals from scrap are not included in this table because available information is inadequate to make reliable estimates of output.

[3]Reported sources of data include the Mines Service and the Statistical Service of Cyprus.

[4]About 4,000 metric tons per year of gypsum was calcined.

[5]Includes crushed aggregate.

[6]Includes crude, semifinished, and worked stone.

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TABLE 2
CYPRUS: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Metric tons unless otherwise specified)

Commodity		Major operating companies and and major equity owners	Location of main facilities	Annual capacity
Aluminum:				
Secondary		A & E Aluminium Recycling Ltd.	Nicosia	NA
Semimanufactures		Muskita Aluminum Industries Ltd.	Extrusion presses, Limassol	18,000
Cement		Vassiliko Cement Works Ltd.	Vassiliko	1,260,000
Do.		Cyprus Cement Co. Ltd.	Moni	400,000
Do.		Bogaz Endustri ve Madencilik	Near Famagusta, northern Cyprus	150,000
Clay, bentonite		Peletico Penta Ltd.	Mines at Pentakomo and Troulli	NA
Do.		Hellenic Mining Co.	Nicosia	NA
Do.		Drapia Mining Co. Ltd.	Drapia, Monagroulli, and Parsata	(1)
Do.		Oryktako Ltd.	Mine at Kato Moni and processing plant at Malounda	10,000
Do.		C & A Quarries Ltd.	NA	NA
Copper, cathode		Hellenic Copper Mines Ltd.	Skouriotissa	(1)
Gypsum		Peletico Ltd.	Quarry and processing plant at Aradipou, near Larnaca	NA
Do.		Zeiplast Chemical Industries Ltd.	Near Moni	NA
Do.		Various	Eledhio and Tuchni	NA
Perlite		Peletico Ltd.	Expanded perlite facility at Larnaka	NA
Do.		Zeiplast Chemical Industries Ltd.	Expanded perlite facility at Moni	NA
Refined petroleum products	thousand 42-gallon barrels	Cyprus Oil Terminal Ltd.	Larnaca storage facility	150
Steel, semimanufactures		B.M.S. Metal Pipes Industries Ltd.	Tube and pipe mill, Paphos	15,000

Do. Ditto. NA Not available.
[1]Inactive in 2008.

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THE MINERAL INDUSTRY OF THE CZECH REPUBLIC

By Mark Brininstool

The Czech Republic was an important Central European producer of heavy industrial goods manufactured by the country's chemical, machine building, and toolmaking industries. Coal, coke, and steel production were of domestic and regional importance. The production of coal for thermal powerplants and the use of nuclear power were important sources of electricity and helped the country maintain a lower level of dependence on imported natural gas for electricity production than many other countries in Central and Eastern Europe.

Minerals in the National Economy

The Czech Republic's real gross domestic product (GDP) decreased by 4.1% in 2009 compared with the GDP in 2008. Mining and quarrying activities made up only about 1% of the total GDP. Mineral commodities made up a relatively small share of total external trade, and the only mineral commodity trade of significance was mineral fuel imports. In 2008 (the latest year for which data were available), the Czech Republic imported $9.1 billion[1] of crude oil and natural gas, which accounted for about 7.3% of the total value of imports in 2008. About 66% of crude oil imports and an estimated 75% of natural gas imports were imported from Russia (Czech Geological Survey, 2009, p. 182, 194, 196; Czech Statistical Office, 2010a-d).

Government Policies and Programs

Three main laws are applicable to the mineral industry in the Czech Republic. Act No. 44/1988 on the Protection and Use of Mineral Resources (the Mining Act), as amended, defines minerals that are owned by the Government, establishes the authority of certain Government agencies with respect to mining activity, and sets out other rules on the management of mineral resources in the Czech Republic. The Czech National Council Act No. 62/1988, on Geological Work (the Geological Act), as amended, establishes the rules for prospecting and exploration of most mineral deposits. Act No. 61/1988 on Mining Operations, Explosives and on the State Mining Administration, as amended, defines appropriate mining methods. The Ministry of the Environment enforces environmental laws in the mining sector and has the authority to revoke exploration and mining leases if environmental laws are violated (Czech Geological Survey, 2009, p. 27-28).

In 1991, the Czech Government passed Government Resolution No. 444/1991, which established geographic limits on the expansion of coal and uranium mining. It was estimated that about 750 million metric tons (Mt) of brown coal reserves as well as some uranium reserves were located in areas where mining is restricted. In October 2009, the Energy and Trade Ministry stated in its 5-year energy plan that it wanted to renew mining in some restricted areas, which set off protests by environmentalists and other groups. The energy plan had not been passed by the end of 2009, and the renewal of mining in restricted areas remained under consideration (Delbos, 2009; Czech Coal Group, 2010, p. 75).

Production

Significant decreases in production were seen across a wide range of mineral commodities in 2009 owing to the reduction in demand for mineral commodities as a result of the world economic crisis. The Czech Republic was especially affected by reduced demand in the European Union (EU), where its major trade partners are located, and by the domestic slowdown in construction investment, which was estimated to have been about 4.3%. Crude steel and pig iron production decreased by about 28% and 26%, respectively, compared with production in 2008, and most industrial minerals were reported to have had significantly decreased production. Total coal production decreased by about 6%, and coke production was estimated to have decreased by about 29% (table 1; Czech Geological Survey, 2009, p. 46; Dykerhoff AG, 2010, p. 64).

Structure of the Mineral Industry

Table 2 is a list of major mineral industry facilities.

Commodity Review

Metals

Iron and Steel.—The Czech Republic had no economically exploitable iron ore deposits and imported all iron ore products used in primary steel production. In 2008 (the latest year for which data were available), about 7.7 Mt of iron ore and concentrate was imported by the Czech Republic; about 60% of these imports came from Ukraine and about 27% came from Russia. ArcelorMittal Ostrava a.s. and Trinecke Zelezarny a.s. were the only producers of pig iron and combined accounted for about 80% of the total crude steel production in the Czech Republic. Crude steel production decreased significantly in 2009 owing to the reduced demand for steel products as a result of the world economic crisis (Czech Geological Survey, 2009, p. 437; Czech Statistical Office, 2010e).

In 2009, Trinecke Zelezarny reduced crude steel production by about 11%, compared with production in 2008, and accounted for about 48% of steel production in the Czech Republic. The company reduced its workforce by 220 employees to 5,319 total employees as part of cost-cutting measures. ArcelorMittal Ostrava operated at only one-third capacity in the spring, but increased production to two-thirds capacity in the summer. In January, the company reported

[1]Where necessary, values have been converted from Czech koruna (CZK) to U.S. dollars (US$) at the rate of CZK19.09=US$1.00.

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that it had 7,450 employees, but by December this figure had been reduced to 5,950 employees (ArcelorMittal Ostrava a.s., 2009a-c; Trinecke Zelezarny a.s., 2010, p. 9, 16, 23-24).

Mineral Fuels and Related Materials

Coal.—The Czech Republic was self sufficient in coal production and, in 2008, coal-fueled powerplants accounted for about 59% of all electricity generated in the Czech Republic. About 6 Mt of bituminous coal and 1.6 Mt of brown coal were exported in 2008 (the latest year for which data were available) (Czech Geological Survey, 2009, p. 158; Severoceske doly a.s., 2010, p. 54).

Production by the Czech Republic's only bituminous coal miner, OKD a.s., was negatively affected by reduced steel production in Europe and the accompanying reduction in demand for coking coal. OKD reported Joint Ore Resources Committee (JORC)-compliant reserves of about 217 Mt of bituminous coal and planned to produce 11 Mt of coal in 2010 (OKD a.s., 2010, p. 16-17).

Combined, the Czech Coal Group's three mines produced 14.4 Mt of brown coal. If current mine expansion restrictions stipulated by Government Resolution No. 444/1991 in 1991 are not lifted, the Czech Coal Group's CSA Mine planned to reduce coal production to about 2.5 million metric tons per year (Mt/yr) from about 5 Mt/yr after 2012 and to continue to produce at this rate until 2020. The Czech Coal Group reported that the CSA Mine had 37.3 Mt of coal reserves within the current mining limits, but that there were 750 Mt of reserves located beyond the mining limit that could significantly extend the life of the mine if the limits were expanded. At the Vrsany Mine, the Sverma site had only about 8.6 Mt of reserves remaining and was expected to close in 2012, but the Vrsany site had about 305.5 Mt of reserves and the Czech Coal Group estimated that it would be able to produce at the rate of 7 Mt/yr until 2052. The Czech Coal Group planned to continue to produce about 280,000 metric tons per year (t/yr) at the Centrum Mine until 2012, when the mine would be closed. The two other brown coal producers, Severoceske doly a.s. and Sokolovska uhelna a.s., produced 22.4 Mt and 8.6 Mt of brown coal, respectively, in 2009. Under current geographic coal mining restrictions, the Czech Coal Group's subsidiary Czech Coal a.s. estimated that production of brown coal in the Czech Republic would be 45 Mt/yr until 2013, 40 Mt/yr from 2013 until 2021, 33 Mt/yr from 2021 until 2023, 26.5 Mt/yr from 2023 until 2032, 17.5 Mt/yr from 2032 until 2039, 8.5 Mt/yr from 2039 until 2044, and 7 Mt/yr from 2044 until 2052 when brown coal mining would completely stop (Czech Coal Group, 2009; 2010, p. 26, 28, 30, 72; Severoceske doly a.s., 2010, p. 13; Sokolovska uhelna a.s., 2010, p. 2).

Lignit Hodonin s.r.o., which was the Czech Republic's only lignite mining company, was declared insolvent in September. As a result, no lignite was expected to be mined in 2010 (Czech Business Weekly, 2010).

Coke.—Coke production was estimated to have decreased by about 30%. Steel production in the Czech Republic and the EU decreased by 28% and 30%, respectively, which reduced the demand for Czech coke (table 1; World Steel Association, 2009, p. 10; 2010, p. 10).

OKK Koksovny a.s. produced 843,000 metric tons (t) of coke in 2009, which was a decrease of 34% compared with production in 2008. The company's production capacity decreased to 800,000 t/yr from 1.3 Mt/yr when coking battery No. 3 at the Jan Sverma plant was shut down in May owing to low demand for coke. OKK Koksovny's parent company, New World Resources N.V., announced that the Jan Sverma plant would be permanently closed at the end of 2010 and that the production capacity at the Svoboda plant would be increased to 850,000 t/yr after the introduction of a new coke battery and modernization of existing facilities (New World Resources N.V., 2010, p. 34).

In August, Trinecke Zelezarny took one of its two 350,000-t/yr coke-oven batteries out of service for maintenance; it was not scheduled to be restarted until the first quarter of 2011 (Trinecke Zelezarny a.s., 2010, p. 4, 14). In April, it was reported that ArcelorMittal Ostrava was operating at about 40% of capacity and planned to idle some of its production capacity, but it is not known if this happened (Steel Business Briefing, 2009).

Petroleum.—Estimated refined petroleum production was significantly revised for 2005 to 2008 in table 1 owing to the use of company data sources that differed from data that were used in previous Mineral Commodity Summaries. The production capacity for refined petroleum products was revised in table 2 also owing to new information and did not reflect a change in the actual capacity of the Czech Republic's refineries in 2009.

Uranium.—DIAMO s.p. remained the only domestic producer of uranium, and it supplied CEZ a.s. (the owner of the Czech Republic's two nuclear powerplants) with about one-third of the uranium it required. All domestically produced uranium was sent to Russia for processing into fuel. All nuclear fuel for the Dukovany Nuclear Power Station was purchased from the Russian firm OAO TVEL, whereas the Temelin Nuclear Power Station obtained its fuel from Westinghouse Electric Company LLC of the United States. The supplies of fuel from Westinghouse were scheduled to end in 2010, after which time the fuel for Temelin would be supplied by OAO TVEL. CEZ's nuclear powerplants produced about 33% of all electricity in the Czech Republic in 2008. Uran Ltd. of Australia had its applications for exploration licenses in the Brzkov and the Liberec regions rejected but the company had filed an appeal of the decision (CEZ Group, 2010, p. 96; Severoceske doly a.s., 2010, p. 54; Uran Ltd., 2010, p. 7).

Outlook

The international financial crisis was the main influence on the mineral industry of the Czech Republic in 2009. The crisis reduced demand for Czech mineral products both domestically and in export markets and caused a corresponding decrease in the production of mineral commodities. A return to previous rates of production will likely depend mainly on improved economic conditions in the EU and the Czech Republic. Dependence on imports of natural gas and petroleum is likely to continue to affect the trade balance negatively, but production of coal will likely remain stable and provide a significant portion of fuel for electricity generation.

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References Cited

ArcelorMittal Ostrava a.s., 2009a, Hired students demonstrate before the General Meeting: ArcelorMittal Ostrava a.s. press release, August 20. (Accessed September 3, 2010, at http://www.arcelormittal.com/ostrava/AM_tz_73_s1_en.html.)

ArcelorMittal Ostrava a.s., 2009b, Protected workshops obtain more than 70,000 crowns at ArcelorMittal Ostrava: ArcelorMittal Ostrava a.s. press release, December 17. (Accessed September 3, 2010, at http://www.arcelormittal.com/ostrava/AM_tz_89_s1_en.html.)

ArcelorMittal Ostrava a.s., 2009c, Within the voluntary separation programme, company staff of ArcelorMittal Ostrava shall receive a fair social allowance package: ArcelorMittal Ostrava a.s. press release, January 7. (Accessed September 3, 2010, at http://www.arcelormittal.com/ostrava/AM_tz_49_s1_en.html.)

CEZ Group, 2010, Annual report 2009: CEZ Group, 280 p. (Accessed September 7, 2010, at http://www.cez.cz/edee/content/file/investors/2009-annual-report/2009_cezgroup_annual__report_aj.pdf.)

Czech Business Weekly, 2010, Ligni Hodonin prefers bankruptcy: Czech Business Weekly, April 26. (Accessed September 1, 2010, at http://www.cbw.cz/article/lignit-hodonin-prefers-bankruptcy.aspx.)

Czech Coal Group, 2009, Centrum deep mine extends operation until 2012 because of demand: Czech Coal Group press release, February 6. (Accessed September 1, 2010, at http://www.czechcoal.cz/en/novinky/tz/2009/20090206.html.)

Czech Coal Group, 2010, Yearly report of the Czech Coal Group—Business activities and sustainable development in 2009: Czech Coal Group, 127 p.

Czech Geological Survey, 2009, Mineral commodity summaries of the Czech Republic: Prague, Czech Republic, Ministry of the Environment of the Czech Republic, October, 492 p.

Czech Statistical Office, 2010a, Gross value added by industry (current prices): Czech Statistical Office. (Accessed September 2, 2010, at http://apl.czso.cz/pll/rocenka/rocenkavyber.makroek_prod_en.)

Czech Statistical Office, 2010b, Key macroeconomic indicators: Czech Statistical Office, July. (Accessed September 2, 2010, at http://www.czso.cz/eng/redakce.nsf/i/macroeconomic_indicators/$File/AHLMAKRO.xls.)

Czech Statistical Office, 2010c, Statistical yearbook of the Czech Republic 2009—External trade by SITC Rev. 4 commodity section: Czech Statistical Office, November 25. (Accessed September 2, 2010, at http://www.czso.cz/csu/2009edicniplan.nsf/engt/DD0030C5B6/$File/0001091106.xls.)

Czech Statistical Office, 2010d, Statistical yearbook of the Czech Republic 2009—Imports by selected CZ-CPA division: Czech Statistical Office, November 25. (Accessed September 2, 2010, at http://www.czso.cz/csu/2009edicniplan.nsf/engt/DD0030C70E/$File/0001091108.xls.)

Czech Statistical Office, 2010e, Statistical yearbook of the Czech Republic 2009—Imports of selected commodities: Czech Statistical Office, November 25. (Accessed September 2, 2010, at http://www.czso.cz/csu/2009edicniplan.nsf/engt/DD0030C704/$File/0001091105.xls.)

Delbos, Stephan, 2009, Change to mining limits sparks protest: The Prague Post, October 21. (Accessed October 29, 2009, at http://www.praguepost.com/business/2580-change-to-mining-limits-sparks-protest.html.)

Dykerhoff AG, 2010, Annual report 2009: Dykerhoff AG, March, 217 p.

New World Resources N.V., 2010, Annual report and accounts 2009: New World Resources N.V., 172 p.

OKD a.s., 2010, Annual report 2009: OKD a.s., 107 p.

Severoceske doly a.s., 2010, Annual report 2009: Severoceske doly a.s., 144 p.

Sokolovska uhelna a.s., 2010, Performance report for the year 2009: Sokolovska uhelna a.s., 49 p.

Steel Business Briefing, 2009, ArcelorMittal Ostrava to idle blast furnace and coke battery: Steel Business Briefing. (Accessed September 1, 2010, at http://www.steelbb.com/us/?PageID=157&article_id=60176.)

Trinecke Zelezarny a.s., 2010, Annual report 2009: Trinecke Zelezarny a.s., July, 119 p.

Uran Ltd., 2010, Annual report 2009: Uran Ltd., September 23. (Accessed September 7, 2010, at http://www.uranlimited.com.au/images/stories/annual_reports/uran annual report 2009 final.pdf.)

World Steel Association, 2009, World steel in figures 2009: Brussels, Belgium, World Steel Association, 26 p.

World Steel Association, 2010, World steel in figures 2010: Brussels, Belgium, World Steel Association, 26 p.

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TABLE 1

CZECH REPUBLIC: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007	2008	2009
METALS						
Aluminum, metal, secondary[e]		30,000	40,000	48,000 r	47,000 r	45,000
Iron and steel, metal:						
Pig iron	thousand metric tons	4,627	5,192	5,287	4,737	3,483
Steel, crude	do.	6,189	6,862	7,059	6,387	4,594
Semimanufactures, hot rolled	do.	5,782	6,273	6,101 r	5,801 r	4,300 e
Lead, metal, secondary		26,000	29,000	34,000	36,000 r	34,000
INDUSTRIAL MINERALS						
Cement, hydraulic	thousand metric tons	3,978	4,239	4,899	4,710 r	3,637
Clays:						
Bentonite	do.	216	267	335	174	116
Kaolin	do.	3,882	3,768	3,604	3,833	2,886
Other	do.	661	561	679	574	377
Diatomite		38,000	53,000	19,000	31,000	--
Dolomite		419,000	409,000	385,000	449,000	337,000
Feldspar		472,000	487,000	514,000	488,000	431,000
Gemstones, crude, pyrope-bearing rock		43,000	39,000	34,000	24,000 r	22,000 e
Graphite		3,000	5,000	3,000	3,000	--
Gypsum and anhydrite, crude		25,000	16,000	66,000	35,000	13,000
Lime, hydrated and quicklime	thousand metric tons	1,211	1,186	1,277	1,150 r	1,000 e
Nitrogen, N content of ammonia[e]		250,000	250,000	225,000	200,000	200,000
Sand and gravel:						
Common sand and gravel	thousand metric tons	25,335	27,198	28,233	27,306	23,614
Foundry sand	do.	807	773	850	702	374
Glass sand	do.	920	963	942	1,151	990
Stone:						
Dimension stone	do.	927	802	788	723	704
Limestone and other calcareous stones	do.	9,912	10,193	11,279	11,465	9,489
Crushed stone	do.	38,048	41,561	43,214	44,277	38,302
Sulfur, byproduct, all sources[e]		45,000	45,000	45,000	45,000	40,000
Sulfuric acid		230,000 e	263,000 e	275,900	215,000	200,000 e
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Bituminous	thousand metric tons	12,778	13,017	12,462	12,197	10,631
Brown and lignite	do.	49,125	49,374	49,571	47,872	45,616
Total		61,903	62,391	62,033	60,069	56,247
Coke	do.	3,412	3,428	3,258	3,399 r	2,400 e
Fuel briquets from brown coal	do.	300	345	247	156 r	150 e
Gas:						
Manufactured, all types[e]	million cubic meters	1,400	1,400	1,411 [3]	1,442 [3]	1,000
Natural, marketed	do.	356	148	148	168 r	180
Petroleum:[e]						
Crude[4]	thousand 42-gallon barrels	2,100	1,800	1,600	1,600	1,500
Refinery products[5]	do.	54,000 r	55,000 r	52,000 r	58,000 r	52,000
Uranium:						
Mine output, U content		420	383	322	290	286
U_3O_8 content[e]		495	452	380	342	337
Concentrate production, U content		409	358	291	261	243

[e]Estimated; estimated data are rounded to no more than three significant digits. [r]Revised. do. Ditto. -- Zero.

[1]Table includes data available through September 9, 2010.

[2]In addition to the commodities listed, ferrovanadium, secondary copper, precious metals, and zinc metal may have been produced, but available information is inadequate to make reliable estimates of output.

[3]Reported figure.

[4]Figures were converted to barrels from production reported in thousand metric tons, which was reported as the following: 2005—306; 2006—259; 2007—240; 2008—236; 2009—217.

[5]Figures were estimated based on throughput reported in million metric tons, which was reported as the following: 2005—7.74; 2006—7.87; 2007—7.40; 2008—8.25; 2009—7.38.

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TABLE 2
CZECH REPUBLIC: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum, secondary		Alcan Decin Extrusions s.r.o.	Decin, northern Bohemia	NA
do.		Kovohute Holdings DT- Mnisek Division (majority owned by Demonta Trade SE)	Mnisek pod Brdy	NA
Bentonite		Keramost a.s.	Most	NA
do.		LITH s.r.o.	Male Chvojno	NA
Cement		Ceskomoravsky Cement a.s. (Heidelberg Cement AG, 100%)	Mokra	1,200 e
Do.		do.	Radotin	650 e
Do.		Lafarge Cement a.s.	Cizkovicka	1,200
Do.		Holcim (Cesko) a.s.	Prachovice	1,400
Do.		Cement Hranice a.s. (Dyckerhoff, 100%)	Hranice	1,100
Clay		Ceske Lupkove Zavody a.s.	Nove Straseci (refractory clay)	NA
Do.		Chlumcanske Keranicke Zavody a.s.	Chlumcany (kaolin)	NA
Do.		Kaolin Hlubany a.s. (WBB Minerals, 94%)	Podborany	NA
Coal:				
Bituminous		OKD a.s. (New World Resources N.V.)	4 mines near Ostrava and Kravina in eastern Czech Republic	13,000 e
Brown		Severoceske doly a.s. (CEZ Group)	Nastup Tusimice Mine southwest of Chomutov and Bilina Mine in Bilina	23,000 e
Do.		Litvinovska uhelna a.s. (Czech Coal Group)	CSA Mine near Most	5,000 e
Do.		Vrsanska uhelna a.s. (Czech Coal Group)	Vrsany Mine just west of Most (contains the Vrsany and the Sverma sites)	10,000 e
Do.		Dul Kohinoor a.s. (Czech Coal Group)	Centrum Mine in Marianske Radcice	350 e
Do.		Sokolovska uhelna a.s.	Jiri and Druzba Mines at Sokolov	10,000 e
Lignite		Lignit Hodonin s.r.o.	Hodonin, south Moravia	500
Coke		ArcelorMittal Ostrava a.s.	Ostrava	1,500
Do.		OKK Koksovny a.s. (New World Resources N.V.)	Jan Sverma coking plant near Ostrava	400
Do.		do.	Svoboda coking plant near Ostrava	600
Do.		Trinecke Zelezarny a.s. (Moravia Steel a.s., 69%)	Trinec	700
Ferrovanadium		Nikom a.s. (Evraz Vitkovice Steel a.s.)	Vitkovice-Ostrava	NA
Gold, metal, secondary		Kovohute Pribram Nastupickna a.s.	Pribram	NA
Graphite		Grafitove doly Stare Mesto s.r.o.	Stare Mesto	NA
Lead, metal, secondary, refined		Kovohute Pribram Nastupickna a.s.	Pribram	30
Natural gas	million cubic meters	Gasfield operators in Brno and Ostrava regions, including: Moravske Naftove doly a.s. Ceska Naftarska Spol s.r.o. Green Gas DPB a.s. UNIGEO a.s.	Eastern/southeastern Czech Republic, of which: Hodonin do. Paskov Ostrava-Hrabova	200 e, 1
Petroleum:				
Crude	thousand 42-gallon barrels	Oilfield operators around Hodonin, including: Moravske Naftove doly a.s. Ceska Naftarska Spol s.r.o. UNIGEO a.s.	Of which: Hodonin do. Ostrava-Hrabova	2,100 e, 1
Refinery	thousand 42-gallon barrels per day	Paramo a.s. (Unipetrol a.s.)	Refineries at Kolin and Pardubice	20 e
Do.	do.	Ceska Rafinerska (Unipetrol a.s., 51.2%, Eni International B.V., 32.5%, Shell Overseas Investments B.V., 16.3%)	Refineries at Litvinov and Kralupy nad Vltavou	165 e
Pig iron		Trinecke Zelezarny a.s. (Moravia Steel a.s., 69%)	Trinec	2,100
Do.		ArcelorMittal Ostrava a.s. (ArcelorMittal, 83%)	Kunice-Ostrava	3,000
Steel, crude		do.	do.	3,000
Do.		Trinecke Zelezarny a.s. (Moravia Steel a.s., 69%)	Trinec	2,440
Do.		Evraz Vitkovice Steel a.s.	Vitkovice-Ostrava	950
Do.		Vitkovice Heavy Machinery a.s.	do.	200

See footnotes at end of table.

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TABLE 2—Continued
CZECH REPUBLIC: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Steel, crude—Continued:				
Do.		Pilsen Steel s.r.o. (OAO OMZ)	Plzen	150
Do.		Poldi Hutte s.r.o. (Scholz Edelstahl A.G.)	Kladno	120 e
Do.		Zelezarny Hradek a.s. (Z-Group Steel Holding)	Hradek	NA
Do.		Zelezarny Veseli, a.s. (Z-Group Steel Holding)	Veseli nad Moravou	NA
Do.		Zelezarny Chomutov s.p. (Z-Group Steel Holding)	Chomutov	NA
Do.		ZDB Group a.s.	Bohumin	40
Uranium, U content	metric tons	DIAMO s.p.	Rozna I Mine at Dolni Rozinka	500 e

eEstimated. Do., do. Ditto. NA Not available.
1Annual capacity listed is total for all deposits, mines, or companies that produce the commodity.

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The Mineral Industries of Denmark, the Faroe Islands, and Greenland

By Harold R. Newman

DENMARK

The mining, quarrying, and mineral processing sectors have not traditionally been a significant factor in Denmark's economy. Mineral resources were limited and composed mainly of such boggy terrain mineral deposits as limonite (bog ore) and peat. Limonite was no longer exploited. Private ownership and exploitation of minerals were allowed under Danish law, but the country depended mainly on imported raw materials.

Denmark was a member of the European Union (EU). The country's economy depended on imported raw materials and foreign trade. Denmark lies directly in the path of European trade through the Baltic Sea, the North Sea, and the Skagerrak Strait (Denmark Press, 2009).

About two-thirds of Denmark's foreign trade was with EU member countries. In 2009, the other 26 EU countries accounted for 65% of the total Danish external trade, and Norway accounted for another 6%. In 2009, Germany was Denmark's leading trading partner, accounting for 21% of Denmark's imports and 16% of Denmark's exports. The United States was Denmark's leading non-European trading partner. China, which was the fourth ranked supplier of goods to Denmark, supplied 6% of all Danish imports and received 2% of all Danish exports (Statistics Denmark, 2010, p. 350).

U.S. exports to Denmark were valued at $2.1 billion and U.S. imports from Denmark were valued at $5.6 billion. U.S. exports to Denmark included nonferrous metals ($28.2 million), petroleum products ($24.1 million), coal and mineral fuels ($12.2 million), and metallurgical-grade coal ($4.7 million). U.S. imports from Denmark included other petroleum products ($28.6 million), iron and steel manufactures ($25.5 million), stone ($10.4 million), steelmaking and unmanufactured ferroalloy materials ($6.3 million), and bauxite and aluminum ($2.2 million) (U.S. Census Bureau, 2009a, b).

Production

Denmark has no known economically exploitable reserves of metallic ores, but it does have reserves of such nonmetallic materials as chalk, clays (including bentonite, kaolin, and lime), peat, salt, and stone (including dimension stone and limestone). Bentonite, cement, and chalk production decreased. Denmark was the only commercial producer of moler, which consists of a natural mixture of diatomite and smectite clay and is an important ingredient of insulation bricks. The country continued to produce natural gas and petroleum from the Danish area of the North Sea; these mineral fuels were Denmark's most valuable mineral commodities. Petroleum production, however, was declining as reserves were becoming depleted. In 2009, petroleum production fell for the fourth year in a row, dropping to about 97 million barrels (Mbbl) from about 138 Mbbl in 2005 (table 1).

Structure of the Mineral Industry

The Danish mineral industry was mostly privately owned. Table 2 is a list of the country's major mineral industry facilities, their capacities, and their locations.

Commodity Review

Metals

Iron and Steel.—In mid-2009, Vorskla Steel Denmark A/S, which was a subsidiary of Vorskla Steel AG of Ukraine, announced that it was declaring bankruptcy. No information was available concerning what action the parent company might take to permanently close the plant or whether it might restart the plant sometime in the future. The plant had stopped electric arc furnace steel production in 2003 (Vorskla Steel Denmark A/S, 2009).

Industrial Minerals

Cement.—Aalborg Portland A/S, which was a subsidiary of Cementir Holdings S.p.A. of Italy, was the sole producer of gray and white cement in Denmark. Aalborg operated seven kilns at its plant in Rordal, which had a capacity to produce 2.7 million metric tons (Mt) of gray cement and 850,000 metric tons (t) of white cement. Aalborg was one of the world's leading manufacturers of white cement, which is used for aesthetic purposes and for highway safety barriers because its whiteness ensures high visibility both day and night (Aalborg Portland A/S, 2009).

Mineral Fuels and Other Sources of Energy

All Denmark's producing natural gas and petroleum fields are located in the Danish area of the North Sea. In 2009, 19 fields of various sizes were in production. Although most Danish fields had passed the period of peak production using known technology, oil companies, both domestic and foreign, showed continued interest in investing in natural gas and petroleum recovery in Denmark. Production in 2009 was derived from 290 production wells that included 87 natural gas wells and 203 petroleum wells (Danish Energy Agency, 2009b, p. 25).

Natural Gas.—OAO Gazprom of Russia agreed to double its shipments of natural gas to Denmark using the proposed Nord Stream pipeline. Gazprom indicated that, beginning in 2012, it would deliver 2 billion cubic meters of natural gas per year to Denmark for 18 years. The Nord Stream pipeline, which was a German-Russian joint project, was envisioned to carry up to 55 billion cubic meters of Russian natural gas to Germany and other European consumers. Construction of the pipeline had not yet begun in 2009 (Downstreamtoday.com, 2009).

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Maersk Olie og Gas AS (MOG) completed the drilling of the Gita-1X exploration well, which is located about 10 kilometers (km) south of the Harald field in the Danish part of the North Sea. The drilling encountered Middle Jurassic sandstone layers containing hydrocarbons. Gita-1X was drilled as a vertical well and reached a depth of 5,162 meters (m) below mean sea level. A number of measurements were carried out for further evaluation. PA Resources AB held a 26.8% interest in the license and MOG held the remaining interest (PA Resources AB, 2009).

Petroleum.—Based on reserves in its currently producing fields, Denmark could expect to continue to be a net exporter of petroleum until the end of 2018 and of natural gas until the end of 2020. If current expectations for the exploration potential were met, Denmark would be able to maintain its position as a net exporter of mineral fuels until 2035 (Danish Energy Agency, 2009b, p. 86).

DONG Energy A/S shut down its Siri field in September after finding cracks in the storage tank under the Siri platform. The shutdown halted production from the Cecilie, the Nini, and the Stine fields, which moved their production to the Siri platform. The combined loss of production was 17,500 barrels per day (Petroleum Economist, 2009).

Renewable Energy.—A large-scale geologic survey by the Geological Survey of Denmark revealed significant supplies of hot water stored in porous sandstone layers beneath Denmark. The distribution of these underground reservoirs was such that many of the existing district heating networks could make use of geothermal heat. In 2009, there were two geothermal plants in Denmark, but the survey showed that 32 existing heating plants could be converted to geothermal energy production if the conversion process is shown to be economically viable (Ministry of Foreign Affairs, 2009).

The Danish Energy Agency announced that it had published the tender for the Anholt offshore wind farm in Kattegat, which is located west of the island of Anholt. It would be Denmark's largest offshore wind farm and would be capable of producing 400 megawatts (MW) of energy, which is the equivalent of the annual electricity consumption of 400,000 households. When completed in 2012, the wind farm would be connected to the Danish electrical grid. Development of the Anholt wind farm was a part of the Government's 2008 Energy Policy Agreement (Danish Energy Agency, 2009a).

Outlook

Further exploration of Denmark's natural gas and petroleum reserves will continue in an effort to offset the declining production. Continued research in new technology and the testing of new exploration methods could play a major role in Denmark's future natural gas and petroleum production. Denmark will continue to be a net exporter of mineral fuels into the near future.

References Cited

Aalborg Portland A/S, 2009, Annual report: Aalborg Portland A/S, 92 p. (Accessed August 9, 2010, at http://www.aalborgportland.com/media/annual_report/annual_reporta_2009.pdf.)

Danish Energy Agency, 2009a, Denmark's largest offshore wind farm ready for tender: Danish Energy Agency. (Accessed August 10, 2010, at http://www.ens.dk/en-us/info/news/news_archives/2009/sider/denmarkslargestoffshorewindfarmreadyfortender.aspx.)

Danish Energy Agency, 2009b, Denmark's oil and gas production and subsoil use 09: Danish Energy Agency, 156 p. (Accessed February 3, 2010, at http://www.ens.dk/Documents/Netboghandel - publikationer/2010/Denmarks_oil_and_gas_production.pdf.)

Denmark Press, 2009, Denmark trade: Denmark Press. (Accessed August 12, 2010, at http://www.pressreference.com/Co-Fa/Denmark.html.)

Downstreamtoday.com, 2009, Gazprom to double gas export to Denmark via Nord Stream pipeline: Alexander's Gas & Oil Connections. (Accessed November 23, 2009, at http://www.gasandoil.com/goc/company/cne94691.htm.)

Ministry of Foreign Affairs, 2009, Major geothermal resources in Denmark ready to be tapped: Ministry of Foreign Affairs [Denmark]. (Accessed August 10, 2010, at http://www.investindk.com/visNyhed.asp?artikelID-22936.)

PA Resources AB, 2009, Drilling of Danish exploration well completed: PA Resources AB, April 15. (Accessed April 16, 2009, at http://www.paresources.se/en/Media/Press_releases2/Drilling-of-Danish-exploration-well-completed.)

Petroleum Economist, 2009, Western Europe—Denmark: Petroleum Economist, v. 76, no. 10, October, p. 32.

Statistics Denmark, 2010, Statistical Yearbook: Statistics Denmark, 538 p.

U.S. Census Bureau, 2009a, U.S. exports to Denmark by 5-digit end-use code: U.S. Census Bureau. (Accessed March 11, 2010, at http://www.census.gov/foreign-trade/statistics/product/enduse/exports/c4099.html.)

U.S. Census Bureau, 2009b, U.S. imports from Denmark by 5-digit end-use code, 2005-2009: U.S. Census Bureau. (Accessed March 11, 2010, at http://www.census.gov/foreign-trade/statistics/product/enduse/imports/c4099.html.)

Vorskla Steel Denmark A/S, 2009, Bankruptcy/closure: Vorskla Steel Denmark A/S. (Accessed August 10, 2010, at http://www.eurofound.europa.eu/emcc/erm/static/factbook_14284.htm?template=searchfactsheets&page=41.)

FAROE ISLANDS

The Faroe Islands, which is a self-governing overseas administrative division of Denmark, had no identified mineral resources. The Faroese economy depended on fishing and salmon farming and was aided by a substantial annual subsidy from Denmark. The principal involvement of the Faroe Islands in the international minerals industry was as a market for imported materials, principally cement, fertilizer materials, and fuels.

Possible discoveries of oil in the future in the Faroese area could lead to eventual oil production and diversification of the Faroese economy. A Faroese company, Atlantic Petroleum P/F, was exploring in four offshore license areas (Atlantic Petroleum P/F, 2009).

Faroe Petroleum plc of the United Kingdom had six offshore exploration licenses. License 017 was awarded in 2008 in the third Faroese licensing round to Faroe Petroleum; the license area is located adjacent to Faroe's existing Rannvà license area, which includes the very substantial Rannvà "A" prospect on the crest of the Wyville-Thomson Ridge. A seismic reprocessing program was to be undertaken to further delineate the structure (Faroe Petroleum plc, 2009).

References Cited

Atlantic Petroleum P/F, 2009, Faroe Islands: Atlantic Petroleum P/F. (Accessed August 9, 2010, at http://www.petroleum.fo/Default.aspx?pageid=8433.)

Faroe Petroleum plc, 2009, News—Faroe Petroleum: Faroe Petroleum plc. (Accessed August 9, 2010, at http://www.fp.fo/Default.aspx?pageid=972.)

GREENLAND

About one-half of Greenland's revenues came from grants from the Danish Government. This was expected to change

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over time following the country's move to greater independence from Denmark that took place in April 2009. The country of Greenland took 100% control of its mineral and oil acreage after the handover, and Danish subsidies were to be progressively reduced. Greenland had been granted self-rule in 1979 and since that time had shown a willingness to move toward a mining-based economy, which would enable the country to use royalties to fund greater independence and promote growth of its economy, which was reliant on fishing and other small internal industries. The private and public sectors contributed to Greenland's economy. Hydrocarbon and mineral exploration activities were the focuses of foreign investment in Greenland. Exploration was most active for base metals, diamond, gemstones, gold, nickel, and platinum-group metals (Ellis, 2009).

On January 1, 2010, the Inatsisartut (Mineral Resource) Act No. 7 of December 7, 2009, which regulates mineral resources and related activities, came into force and replaced the Consolidation Act No. 368 of June 18, 1998. The Mineral Resource Act establishes the foundation and the framework for future control of Greenland's mineral resources, including activities affecting their development. The Act states that mineral resource development activities must be performed in accordance with best international practices, and they may be executed only with the permission of the Naalakkersuisut (Government of Greenland) (Mining Journal, 2010).

The Catlin Arctic Survey reported that within a decade, the Arctic Ocean would be an "open sea" almost entirely free of ice. Ice cover during the northern summer months is expected to have disappeared entirely within 20 years, but most of the decrease would happen before 2020. Mineral resource companies have been among the first to view this as a commercial opportunity. Greenland was also attractive to investors because, despite the high cost of operating in such extreme conditions, the country was politically stable (Pagnamenta, 2010).

Commodity Review

Metals

Gold.—In late 2008, Nalunaq Gold Mine A/S (a subsidiary of Crew Gold Corp. of the United Kingdom) decided to suspend its operations at Nalunaq owing to the continued high costs of mining, shipping, and processing minerals. In 2009, Angel Mining plc of the United Kingdom (formerly Angus & Ross plc) announced that it had acquired the entire assets of Nalunaq Gold for $1 million. Angel Mining announced that it intended to bring the Nalunaq Mine back into operation as soon as possible. As of September 2009, Angel had refurbished all the mining equipment at Nalunaq and was preparing the underground chamber that housed the processing plant. First doré production was expected by yearend (Metals Economics, 2009b).

NunaMinerals A/S announced that it had made significant gold discoveries in two of five drilled targets in the Vagar exclusive license. The discoveries were made on the north coast of the 300-square-kilometer (km^2) Niaqomaarsuk Peninsula, which is located about 25 km from the Nalunaq Mine where commercial gold mining began in 2004. NunaMinerals stated that further investigation, including drilling and test mining, would be needed to determine the grade and volume of the discoveries (Mineweb, 2009).

Lead and Zinc.—Angel Mining was continuing with its exploration program at the Black Angel Mine area in 2009. Angel Mining was storing equipment at the mine, and construction was scheduled to commence in Spring 2010; mining would commence in late 2010. Angel Mining announced that contractors had been selected for the development of the mineral processing and waste handling plants. The proposed process would consist of a primary and a secondary circuit, which would involve pre-concentration by optical sorting followed by milling and fine grinding, and then feeding into a conventional froth flotation plant. This process was expected to produce concentrates grading 69% to 71% lead and 59% to 61% zinc (Metals Economics, 2009a).

Ironbark Zinc Ltd. announced the results of its 2009 drilling program at its Citronen project. Highlights included 4.2 m of core grading 11.2% zinc and 3 m of core grading 5.3% zinc. The drill program was carried out in the Beach zone, which has an estimated resource of 17 Mt of ore grading 7.1% zinc and 10 Mt of estimated inferred ore grading 5.5% zinc. A program of geotechnical drilling and infill drilling was to continue through the 2009 season (Australia's Paydirt, 2009).

Rare Earths.—Greenland Minerals and Energy Ltd. reported that it had access to what could be some of the world's largest rare earth deposits, second only to those in China. The Kvanefjeld project was estimated to have the potential to supply about 25% of the world's demand for rare earths. Uranium was also associated with the deposit and could be produced. Greenland, however, has a zero-tolerance approach to uranium mining owing to environmental concerns. This policy would have to be changed for the rare earths project to be developed (Desal, 2009).

Industrial Minerals

Gemstones.—True North Gems Inc. announced that the field-related components of the 2009 advanced exploration and engineering program had been completed at the company's 823-km^2 Fiskenaesset Ruby project, which is located on the southwest coast of Greenland. A 160-t Aappaluttoq bulk sample was shipped to Canada for processing. True North continued with plans to upgrade the Fiskenaesset processing plant for the preparation of sized gravity concentrates. Reinterpretation of surface outcrops and logging of all drill cores was continuing in 2009 (Greenland Mineral Exploration Newsletter, 2009).

Mineral Fuels

Petroleum.—Cairn Energy plc announced that it had secured a rig to allow it to commence a drilling program in the Disko West area offshore western Greenland in the second half of 2010. A sixth generation dynamically positioned drill ship, the *Stena Forth*, had been contracted to start operations in the summer drilling season (from June through October), subject to all required Government approvals (Cairn Energy plc, 2009).

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Outlook

Greenland has an abundance of mineral and natural resources. The global warming trend is expected to continue to open more areas for exploration. New mineral deposits are expected to be discovered as exploration accelerates. Finding new sources of hydrocarbons is likely to continue to be very important for Greenland. Greenland's new political status is expected to encourage mineral development.

References Cited

Australia's Paydirt, 2009, Greenbacks saved in Greenland: Australia's Paydirt, v. 2, issue 164, August, p. 7.

Cairn Energy plc, 2009, Cairn secures rig for Greenland exploration: Cairn Energy plc, December 21. (Accessed August 17, 2010, at http://www.cairnenergy.com/NewsDetail.aspx?id=1040.)

Desal, Pratima, 2009, New rare earth metals firm to list in London next year, would be second only to China in scale: Mineweb Holdings Ltd. November 10. (Accessed August 12, 2010, at http://www.mineweb.co.za/mineweb/view/mineweb/en/page72103?oid=92550&sn=Detail.)

Ellis, Amanda, 2009, Vote for brighter mining future: RESOURCESTOCKS Magazine, January, p. 24.

Greenland Mineral Exploration Newsletter, 2009, Advanced field program completed by True North Gems: Greenland Mineral Exploration Newsletter. (Accessed March 1, 2010, at http://www.geus.dk/minex/minex-35-uk.htm.)

Metals Economics, 2009a, Black Angel: Metals Economics. (Accessed October 14, 2009, at http://services.metalseconomics.com/Minesearch/Default.asp?profile&projAid=93057.)

Metals Economics, 2009b, Nalunaq: Metals Economics. (Accessed October 14, 2009, at http://services.metalseconomics.com/Minesearch/Default.asp?profile&projAid=94046.)

Mineweb, 2009, NunaMinerals announces significant gold discovery in Greenland: Mineweb Holdings Ltd. (Accessed November 3, 2009, at http://www.mineweb.com/mineweb/view/mineweb/en/page34?oid=91780&sn=Detail.)

Mining Journal, 2010, A supplement to Mining Journal—Greenland: Mining Journal, March, p. 3.

Pagnamenta, Robin, 2010, Melting ice sparks rush for mineral exploration in Greenland: The Sunday Times [Perth, Australia]. (Accessed July 28, 2010, at http://www.perthnow.com.au/business/business-old/melting-ice-sparks-rush-for-mineral-exploration-in-greenland/story-e6frg2qu-1225788227572.)

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TABLE 1

DENMARK: ESTIMATED PRODUCTION OF MINERAL COMMODITIES[1,2]

(Metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008	2009
Aluminum metal, secondary		20,000	25,000	30,000	25,000	25,000
Cement, hydraulic	thousand metric tons	2,120	2,937 [3,4]	2,871 [4]	2,539 [r,4]	1,578 [4]
Chalk, calcium carbonate	do.	1,950	1,900	1,950	1,900	446 [4]
Clays:[5]						
Bentonite		18,515 [4]	19,211 [4]	20,093 [4]	22,458 [r,4]	20,000
Fire clay		25	25	25	25	25
Kaolin		2,500	2,500	2,500	2,500	2,500
Other		5,500	5,000	5,000	5,000	5,000
Moler, extracted	thousand cubic meters	234	240 [r]	241	252 [r,4]	250
Gas:						
Manufactured	million cubic meters	1,500	1,500	1,500	1,500	1,500
Natural, gross	do.	10,540 [4]	10,304 [r,4]	9,128 [r,4]	9,564 [r,4]	9,600
Gold[3]	kilograms	1,000	1,500	1,639 [4]	1,518 [4]	1,600
Lime, hydrated and quicklime		120,000	115,000	115,000	115,000	115,000
Natural gas plant liquids	thousand 42-gallon barrels	48,000	48,000	48,000	50,000 [r]	48,000
Nitrogen, N content of ammonia		1,600	1,600	1,600	1,600	1,600
Olivine	thousand metric tons	450	1,000	1,100	1,100	1,100
Peat	thousand cubic meters	298,000 [r]	298,000 [r]	242,000 [4]	145,000 [r]	145,000
Petroleum:						
Crude	thousand 42-gallon barrels	137,642 [r,4]	124,830 [r,4]	113,734 [r,4]	104,573 [r,4]	97,455 [4]
Refinery products:						
Liquefied petroleum gas	do.	1,708 [4]	1,898 [r,4]	1,862 [r,4]	1,314 [r,4]	1,300
Gasoline	do.	16,300 [4]	16,863 [r,4]	16,608 [r,4]	16,352 [r,4]	16,000
Naphtha	do.	49 [4]	50	50	50	50
Jet fuel	do.	3,979 [4]	4,818 [r,4]	4,271 [r,4]	3,942 [r,4]	3,900
Distillate fuel oil	do.	24,053 [r,4]	24,601 [r,4]	24,054 [r,4]	23,068 [r,4]	23,000
Refinery gas	do.	1,795 [4]	1,800 [r]	1,800 [r]	1,800 [r]	1,800
Residual fuel oil	do.	9,059 [4]	9,478 [r,4]	9,125 [r,4]	8,870 [r,4]	8,800
Total	do.	56,943 [r,4]	59,500 [r]	57,800 [r]	55,400 [r]	54,900
Salt, all forms		610,000	600,000	600,000	600,000	600,000
Sand and gravel:						
From onshore deposits	thousand cubic meters	28,400	28,000	28,000	28,000	28,000
From offshore deposits	do.	600	600	600	600	600
Total	do.	29,000	28,600	28,600	28,600	28,600
Of which sand, industrial (sales)	do.	500	500	500	500	500
Stone:						
Dimension (mostly granite)	thousand cubic meters	207 [r]	206 [r]	205 [r]	192 [r]	247 [4]
Limestone:						
Agricultural		700,000	700,000	700,000	700,000	700,000
Industrial		250,000	250,000	250,000	250,000	250,000
Sulfur, recovered		4,223 [4]	4,142 [4]	3,896 [4]	3,800	3,800

[r]Revised. do. Ditto.

[1]Estimated data are rounded to no more than three significant digits; may not add to totals shown.

[2]Table includes data available through March 31, 2010.

[3]Production from Greenland Island.

[4]Reported figure.

[5]Denmark was believed to produce kaolin; however, data on production were not available.

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TABLE 2
DENMARK: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Cement		Aalborg Portland A/S (Cementir Holding S.p.A.)	Plant at Rordal	2,700
Chalk (calcium carbonate)		A/S Faxe Kalkbrud	Quarries at Stevns and Sigerslev	250
Diatomite (moler)	thousand cubic meters	Dansk Moler Industri A/S (Damolin)	Quarries on Mors and Fur Islands	145
Kaolin		Aalborg Portland A/S	Mine and plant on Bornholm Island	25
Lime		A/S Faxe Kalkbrud (Aalborg Portland Holding A/S)	Plant at Stubberup, near Fakse, on Zealand Island	200
Natural gas	million cubic meters	Maersk Olie og Gas A/S	Roar and Tyra Gasfields, Danish North Sea	2,550
Olivine		Minelco A/S	Seqi Mine, Fiskefjord, west Greenland	1,100
Petroleum:				
Crude	barrels per day	Dansk Underground Consortium	Dan, Gorm, Rolf, and Tyra, Danish North Sea	127,000
Refined	do.	A/S Dansk Shell	Fredericia	55,000
Do.	do.	Kuwait Petroleum Refining A/S	Gulfhavn and Skaelskor	56,500
Do.	do.	Statoil A/S	Kalundborg	65,000
Salt		Dansk Salt I/S	Mine (brine) at Hvornum, plant at Mariager	600

Do., do. Ditto.

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The Mineral Industry of Estonia

By Richard M. Levine

After recording an 8% average annual increase in the gross domestic product (GDP) since 2000, Estonia's economy began to show signs of slowing in 2007 when the GDP increased by only 6.3%. Then, in 2008, as a result of the global economic crisis, the GDP decreased by 3.6% and then by an additional 14.1% in 2009. The unemployment rate by the second quarter of 2010 was 18.6%. The Estonian Government, nevertheless, kept budget deficits low, and Estonia was scheduled to join the euro area on January 1, 2011. Estonia's economy began to grow again in the fourth quarter of 2009, led by strong export growth (U.S. Department of State, 2010).

Estonia's mining industry was primarily engaged in extracting industrial minerals, which included clays, limestone, and sand and gravel; oil shale; and peat. Estonia is not rich in mineral resources, although the country does have one of the world's leading commercially exploited oil shale deposits. The Rakvere phosphate deposit in Estonia is one of the largest phosphorite deposits in Europe, although it had not been mined because of environmental concerns. Estonia also has some of the richest peatlands in northern Europe, including more than 9,000 mires that cover about 22% of Estonia's territory; within these mires are more than 300 peat deposits (United Nations Department of Economic and Social Affairs, Division for Sustainable Development, 2009).

Minerals in the National Economy

Estonia supplied about 95% of its electricity needs with locally mined oil shale. It imported from Russia all its natural gas and petroleum, equaling about 30% of its total energy consumption. Alternative energy sources, which included biomass, peat, and wood, made up about 9% of primary energy production. An undersea electricity cable commissioned in December 2006 allowed Estonia to export electricity to Finland (U.S. Department of State, 2008).

Estonia had 64 ports along its coast, 31 of which handled commercial shipping and were open to vessels from other countries. Oil refinery products from Russia comprised more than 50% of the cargo handled at the country's ports. The Port of Tallinn was the country's largest port in terms of freight handled. In the area of mineral shipments, Muuga Harbor, which was the main cargo handling harbor for the Port of Tallinn, handled crude oil and petroleum refinery products. The AS Parnu Sadam Port handled peat, the Kunda Port handled cement, the Paldiski South Harbor of the Port of Tallinn handled scrap metal, the Paljassaare Harbor of the Port of Tallinn handled petroleum refinery products and coal, and the Sillamae Port handled metals and petroleum refinery products (Enterprise Estonia, 2008).

Production

In 2009, industrial production decreased by an estimated 24% compared with that of 2008 (U.S. Central Intelligence Agency, 2010). The sharp decreases in the GDP and in industrial production were reflected in sharp decreases in coke production and production in the industrial minerals sector. In the mineral fuels sector, production of some mineral fuels, such as peat and fuel oil, increased, although reported production of oil shale decreased, but at nowhere near the rate of decrease that took place for industrial mineral commodities.

Structure of the Mineral Industry

Most of Estonia's mineral production enterprises were privately owned. Silmet was privatized in 1997 (AS Silmet, 2008a). In December 2005, the Estonian Silmet Group sold its majority holding in AS Silmet to Zimal SA of Switzerland, which, through the Russian holding company Mineral Group, controlled loparite mining at the JCS Sevredmet enterprise in Russia. Zimal also controlled the Solikamsk magnesium works in Russia, which processed loparite concentrates from the Lovozerskoye deposit at the Sevredmet enterprise (AS Silmet, 2006; Ministry of Foreign Affairs, 2006). In December 2010, the Silmet Group reacquired the 50% plus one share in AS Silmet that it had sold to Zimal. Following the buyback, the Silmet Group owned 90% of AS Silmet and 10% still belonged to the Austrian company Treibacher Industrie AG. In 2010, Zimal also sold its interest in the Sevredmet enterprise and the Solikamsk magnesium works in Russia (Estonian Investment and Trade Agency, 2010b).

In 2009, oil shale production was under the control of Eesti Energia AS, which was a state-owned company engaged in the production, sale, and transmission of electric power. Eesti Energia's main raw material for energy production, oil shale, was extracted from mines owned by the company (Eesti Energia, 2008). Oil shale mining was conducted by Eesti Põlevkivi AS [Estonian Oil Shale Co.], which was a subsidiary of Eesti Energia (International Oil Shale Symposium, 2008). Viru Keemia Grupp AS (VKG), which processed oil shale, was privately owned.

Commodity Review

Metals

Niobium and Rare-Earth Metals.—The Silmet Group was the only producer of rare-earth metals in the world outside of China, which produced more than 95% of the world's rare-earth metals; the rest were produced at the Silmet plant in the city of Sillamae in northeastern Estonia. Plants in other parts of the world that had produced rare-earth metals from Chinese raw material were closed by late 2009, as China stopped supplying raw materials to these plants to supply its own industries. Silmet received its raw material from the Sevredmet mining and beneficiation complex in Russia, which mined the Lovozerskoye deposit on the Kola Peninsula. By late 2009, the Lovozerskoye deposit was the only source of rare-earth raw materials outside

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of China that was being mined. Owing to the high prices for rare-earth metals, Silmet was planning to increase its production by a large percentage and claimed it could do so because the production line set up at Silmet in the 1990s provided the capacity for Silmet to do this without major investment. During the past decade, Silmet had been trying to achieve a larger portion of sales in the global rare-earth market. Silmet originally was established as a uranium enrichment plant for the Soviet Union and then in the 1970s, the factory buildings were transformed into a rare-earth metals and rare metals production facility (Chiou, 2010; Estonian Investment and Trade Agency, 2010a).

Silmet annually produced up to 3,000 metric tons (t) of rare-earth products and 700 t of rare-metal products (AS Silmet, 2008b). Its products included several compounds of the light and middle group of rare-earth metals and compounds, such as cerium, lanthanum, neodymium, praseodymium, and samarium-europium-gadolinium carbonates, oxides, metals, and chloride and nitrate solutions (AS Silmet, 2009). Silmet was reportedly was one of the world's leading producers of niobium metal chips (Sillamäe, 2007). At yearend 2007, Silmet began production of cerium carbonate 45 at a grade of 99.9% (AS Silmet, 2007).

The Silmet complex employed about 550 people. The complex included a factory for rare-earth metals separation, a factory for rare-metals production, and a metallurgical factory. The factory for rare-earth metals separation produced hydroxides, oxides, fluorides, carbonates, and solutions as well as liquid nitrogenous fertilizers. The factory for rare metals produced rare-metal hydroxides, oxides, and ammonium bifluoride. The metallurgical factory produced metallic products, which included niobium and tantalum chips, ingots, metallic powders, and hydrides, and rare-earth metals products, which included neodymium metal ingots, neodymium ferroboron alloys, and mischmetal. About 99% of the raw materials used in production at Silmet were imported and 99% of the products sold were exported (AS Silmet, 2008b, c).

Mineral Fuels

Oil Shale.—In Estonia, which has no resources of coal, natural gas, or oil, the use of oil shale as a fuel had taken place since the first quarter of the 20th century. During the time when Estonia was a part of the Soviet Union, Estonia had access to inexpensive natural gas, and the use of oil shale decreased. After regaining its independence, however, Estonia had to pay the market price for natural gas and began to increase the use of oil shale. Oil shale became of increasing importance and was used for about 95% of the country's electricity generation. Oil shale obtained from shale treatment facilities supplied 100% of the country's liquid boiler fuel, and oil shale was used as a raw material in the cement and chemical industries (Parkman, 2008).

About 85% of the oil shale mined in Estonia was burned as fuel in several large electric powerplants in northeastern Estonia. The remainder was retorted for shale oil, which was used in the manufacture of fuels and petrochemicals. Estonian oil shale manufacturers were participating in oil shale development in other countries. Eesti Energia was developing an oil shale mine in Jordan, and the VKG was participating in the development of the Boltyshk oil shale deposit in Ukraine (Parkman, 2008).

Energy-related activities were the leading contributors to Estonian greenhouse gas emissions. Fossil fuels are used to satisfy most of Estonia's electrical energy demand, with oil shale comprising more than 68% of total fuel consumption. Owing to the high carbonate content in oil shale, the content of alkaline oxides, especially CaO, in combustion products was very high. Also, the thermal combustion of oil shale in powerplants had led to increasing amounts of heavy metals in ash, including radioactive ones, deposited on ash fields or emitted into the atmosphere. The concentration of radioactive isotopes in oil shale dumps, which covered more than 20 square kilometers in northeastern Estonia, was many times higher than the background values in soils, and had reached 5.5 grams per metric ton (Raukas and Punning, 2009).

Estonia was the leading producer of oil shale in Europe and had been mining high-grade marine oil shale (kukersite of Ordovician age). In 2009, about 14.9 million metric tons (Mt) of oil shale was mined from underground and open pit mines, which was about a 7% decrease compared with that of 2008 (Eesti Energia, 2010a). Because of depleting reserves at existing mines, Eesti Energia started preparation to develop the new Uus-Kiviõli underground mine to ensure raw material for future energy production. Reserves at the new mine were reportedly 150 Mt of commercial oil shale, and the mine would employ between 700 and 900 people (Eesti Energia, 2010b).

Eesti Energia owned the largest oil-shale-fueled powerplants in the world, the Balti and the Eesti powerplants, which burned about 12 million metric tons per year (Mt/yr) of oil shale. In 2004, a new circulating fluidized bed (CFB) boiler technology was introduced for electric power generation. This new technology reportedly increased boiler efficiency, and the percentage of harmful industrial contaminants emitted fell substantially to below Estonian and European Union (EU) permissible limits. In 2008, the Government of Estonia accepted a State Development Plan for oil shale utilization up to 2015. Analysis contained in the plan showed that environmentally negative aspects of the burning of oil shale could be significantly reduced by a transition from pulverized combustion technology to CFB technology. Also, that once this switch was made, all environmental parameters would then be in harmony with the requirements of EU directives (Raukas and Punning, 2009).

As of November 2008, Eesti Energia and Outotec Oyj of Finland were reportedly forming a joint venture for the development and marketing of environmentally sustainable and economically viable oil shale processing methods. Eesti Energia would have a majority 60% stake in the new company and Outotec would own the remaining 40% stake. The new company intended to become a significant supplier of oil shale technology by combining Eesti Energia's experience in oil shale mining and processing with Outotec's expertise in CFB technology (Green Car Congress, 2008).

VKG, which was the country's leading oil shale processing company and one of the world's leading shale oil producers, employed about 1,300 people in 2009. In 2009, its turnover was more than 1.6 billion kroons ($13.9 million[1]), which was an 18% decrease compared with that of 2008

[1]Where necessary, values have been converted from Estonian kroons to U.S. dollars (US$) at the exchange rate of 11.482 kroons=US$1.00 for 2009.

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(Viru Keemia Grupp AS, 2010a, p. 3). VKG's products included bitumen; coke; paints, primers, and resins; pitch; phenols and phenol products; shale oils and fuel oils; and specialty chemicals and alkylresorcinols (Viru Keemia Grupp AS, 2010b).

VKG was projected to produce 1.7 Mt of liquid fuel in 2015, which would meet the country's entire annual need for liquid fuel, including fuel for transport. VKG's primary objective in 2009 remained the expansion of shale oil production, and the company continued with construction of the Petroter oil plant, which was launched in 2007, completed in August 2009, opened in December 2009, and began production in January 2010, and which had the capacity to process 900,000 metric tons per year of oil shale. The plant's design was based on technology used to process fine-grained oil shale. The first batches of oil were produced and marketed in November 2009 (Viru Keemia Grupp AS, 2010a, p. 6).

VKG made a long-term commitment to study new methods of refining oil shale into motor fuel. In 2008, VKG, in conjunction with the Finnish engineering firm Rintekno OY, engaged in designing a project for a 14,000-barrel-per-day shale oil refinery that would use a hydrogen process to produce motor fuel. By yearend 2009, VKG reported that it had discovered an economically efficient way to produce diesel fuel that conforms to EURO V quality standards, and that the company was making plans to construct a refining complex. The complex would be launched by the end of 2014 to produce diesel fuel and distillate fuel oil (Viru Keemia Grupp AS, 2010a, p. 6). VKG also held permits to develop oil shale mining in the country. In 2009, VKG was engaged in the development of the Ojamaa underground mine (Viru Keemia Grupp AS, 2010a, p. 5).

Outlook

Although it is a small country, Estonia is uniquely positioned to play a significant role in the global development of two mineral products—rare-earth metals and oil shale. Estonia has the only operating rare-earth-metals processing plant outside of China and has been one of the world's major producers and consumers of oil shale. Estonia has acquired experience in the processing of rare-earth metals, which could be drawn upon by other countries as they seek to augment rare-earth metals supplies, which have been curtailed by China, and experience in the mining, processing, and use of oil shale, which could be of use as countries seek to develop and use oil shale as an alternative to depleting oil reserves.

References Cited

AS Silmet, 2006, Silmet press release: AS Silmet, January 3. (Accessed December 27, 2010, at http://www.silmet.ee/default.aspx?m1=44&m2=&m3=&m4=&id=157.)

AS Silmet, 2007, New product—Cerium Carbonate 45 Grade 99.9: AS Silmet, December 1. (Accessed August 19, 2010, at http://www.silmet.ee/default.aspx?m1=44&m2=&m3=&m4=&id=162.)

AS Silmet, 2008a, History: AS Silmet. (Accessed December 10, 2008, at http://www.silmet.ee/default.aspx?m1=48&m2=52&id=28&lang=1.)

AS Silmet, 2008b, Overview: AS Silmet. (Accessed December 10, 2008, at http://www.silmet.ee/default.aspx?m1=48&m2=51&lang=1.)

AS Silmet, 2008c, Production: AS Silmet. (Accessed December 10, 2008, at http://www.silmet.ee/default.aspx?m1=45&lang=1.)

AS Silmet, 2009, Rare earth metals: AS Silmet (Accessed February 6, 2010, at http://www.silmet.ee/default.aspx?m1=45&m2=85&lang=1.)

Chiou, Pauline, 2010, China rare earth spat helps Estonia firm ...: AS Silmet, November 23. (Accessed December 30, 2010, at http://www.silmet.ee/default.aspx?m1=44&m2=&m3=&m4=&id=174.)

Eesti Energia, 2008, The oil shale energy industry: Eesti Energia. (Accessed December 7, 2008, at http://www.energia.ee/index.php?id=1&L=1.)

Eesti Energia, 2010a, Mining: Eesti Energia. (Accessed December 28, 2010, at https://www.energia.ee/en/about/organization/concern/kaevandused.)

Eesti Energia, 2010b, Novaya shakhta [New mine]: Eesti Energia. (Accessed December 28, 2010, at https://www.energia.ee/ru/about/organization/concern/uuskaevandus.)

Enterprise Estonia, 2008, Transportation: Enterprise Estonia, June. (Accessed December 8, 2008, at http://www.investinestonia.com/index.php?option=displaypage&Itemid=111&op=page&SubMenu=.)

Estonian Investment and Trade Agency, 2010a, Estonia's Silmet benefiting from high prices of rare earth metals: Estonian Investment and Trade Agency, October 25. (Accessed December 27, 2010, at http://www.investinestonia.com/en/news/estonias-silmet-benefiting-from-high-prices-of-rare-earth-metals.)

Estonian Investment and Trade Agency, 2010b, Silmet Grupp boosts holding in Silmet to 90 pct through share repurchase: Estonian Investment and Trade Agency, December 17. (Accessed December 27, 2010, at http://www.investinestonia.com/en/news/silmet-grupp-boosts-holding-in-silmet-to-90-pct-through-share-repurchase.)

Green Car Congress, 2008, Estonian and Finnish companies establish oil shale JV: Green Car Congress, November 6. (Accessed December 27, 2010, at http://www.greencarcongress.com/2008/11/estonian-and-fi.html.)

International Oil Shale Symposium, 2008, Field trips: International Oil Shale Symposium. (Accessed December 11, 2008, at http://www.oilshalesymposium.com/index.php?id=13.)

Ministry of Foreign Affairs, 2006, Estonian economy—Industry: Tallinn, Estonia, Ministry of Foreign Affairs, v. 10, no. 1, January, 7 p. (Accessed December 10, 2008, at https://www.static.vm.ee/static/Failid/101/Economy-Jan2006.pdf.)

Parkman, Janek, 2008, Estonian oil sector undergoing changes: Turku, Finland, Pan-European Institute, Baltic Rim Economies, Expert Article 235, Bimonthly Review 5, October 31, 1 p. (Accessed December 28, 2008, at http://www.tse.fi/FI/yksikot/erillislaitokset/pei/Documents/bre2008/BRE 5-2008/245 - 5-2008 - Expert articles.pdf.)

Raukas, Anto, and Punning, Jaan-Mati, 2009, Environmental problems in the Estonian oil shale industry: Energy & Environmental Science, issue 2, p. 723-728. (Accessed December 29, 2010, at http://www.rsc.org/delivery/_ArticleLinking/DisplayArticleForFree.cfm?doi=b819315k&JournalCode=EE%E2%80%9C.) DOI: 10.1039/b819315k

Sillamäe, 2007, Business in Sillamäe: Sillamäe, May 3. (Accessed December 10, 2008, at http://www.sillamae.ee/index.php?page=366&&PHPSESSID=ab93a1f73565f1eda6a3fb789d2d146e.)

United Nations Department of Economic and Social Affairs, Division for Sustainable Development, 2009, Estonia—UN CSD18—National reporting on mining: United Nations Department of Economic and Social Affairs, National Report CSD18, 5 p. (Accessed January 6, 2011, at http://www.un.org/esa/dsd/dsd_aofw_ni/ni_pdfs/NationalReports/estonia/CSD18_ESTONIA_Mining.pdf.)

U.S. Central Intelligence Agency, 2010, Estonia, *in* The world factbook: U.S. Central Intelligence Agency, December 16. (Accessed December 27, 2010, at https://www.cia.gov/library/publications/the-world-factbook/geos/en.html.)

U.S. Department of State, 2008, Estonia: U.S. Department of State background note, May. (Accessed December 28, 2010, at http://www.state.gov/outofdate/bgn/estonia/104508.htm.)

U.S. Department of State, 2010, Estonia: U.S. Department of State background note, November 12. (Accessed December 28, 2010, at http://www.state.gov/r/pa/ei/bgn/5377.htm.)

Viru Keemia Grupp AS, 2010a, Consolidated annual report 2009: Viru Keemia Grupp AS, 74 p. (Accessed December 28, 2010, at http://www.vkg.ee/cms-data/upload/kontsern/vkg-maa-2009-eng.pdf.)

Viru Keemia Grupp AS, 2010b, VKG Oil AS—Products and services: Viru Keemia Grupp AS. (Accessed December 28, 2010, at http://www.vkg.ee/eng/products-and-services/vkg-oil-as.)

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TABLE 1

ESTONIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007	2008	2009
Cement:						
Clinker		88,800	65,100	302,700	324,000	314,000
Portland, other		726,000	848,900	937,400	808,000 r	326,200
Clays:						
For brick	cubic meters	151,800	231,400	214,000 e	138,106	70,000
For cement	do.	37,200	56,700	51,900 e	33,494	15,000
Coal, lignite	thousand metric tons	14,588	14,188	16,647	16,193	16,000 e
Coke, electrode		37,195	32,659	39,916	35,380	21,400
Crushed stone used for concrete aggregates, for roadstone, and for other construction use		--	8,298,400	8,855,800	7,891,000	5,400,300
Dolomite:						
For building	cubic meters	261,700	378,300	356,000 e	329,634	200,000
For finishing	do.	2,000	1,660	2,720 e	2,519	1,000
For industry (technological limestone)	do.	155,300	128,540	210,000 e	194,447	100,000
Fuel oil		367,400	389,200	436,600	444,800	489,300
Gravel, pebbles, shingle and flint	cubic meters	597,100	410,300	1,229,900	717,000	400,000
Lead, metal, secondary		7,000 e	9,000	10,000	10,000	8,000
Lime		37,000	39,700	43,500	59,400	26,200
Limestone:						
For building	cubic meters	1,922,000	2,343,800	2,750,000 e	2,627,741	1,200,000
For cement	do.	335,100	340,300	480,000 e	458,661	200,000
For industry (technological limestone)	do.	86,300	87,600	126,000 e	120,398	80,000
Niobium, metal, chips		NA	NA	NA	NA	NA
Nitrogen, N content of ammonia		78,912	73,158	66,746	78,912	50,000
Oil shale	thousand metric tons	12,349	14,004	16,393	16,117 r	14,939
Peat, all uses:[3]		1,034,000 r	1,206,800 r	964,000 r	732,700 r	859,700
Of which:						
For fuel		378,000 r	506,800 r	475,000 r	213,400 r	328,000
Briquets		67,600 r	100,600 r	128,400 r	67,500 r	45,300
Rare-earth metals e		3,000	3,000	3,000	3,000	3,000
Sand and gravel	cubic meters	3,227,200	4,214,200	5,275,900	4,750,800	3,000,000
Silica sand (technological sand)	do.	53,800	--	--	--	--
Sulfuric acid	kilograms	NA	5	NA	NA	NA
Tantalum, metal, chips		NA	NA	NA	NA	NA

eEstimated; estimated data are rounded to no more than three significant digits. rRevised. NA Not available. -- Zero.

[1]Table includes data available through December 27, 2010.

[2]In addition to the commodities listed, Estonia produces sulfur, but available information is inadequate to make estimates of output.

[3]Total peat production is reported as that portion of total peat production used for fuel. It may be assumed that the portion of total peat production not used as fuel is used in agricultural applications, although this is not specified.

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THE MINERAL INDUSTRY OF FINLAND

By Harold R. Newman

Finland, which is a member country of the European Union (EU), has a long tradition of mining that dates back to 1540 when iron ore mining commenced. The country's mining laws and legislation encourage exploration and development. Finland is known for its metallurgical expertise and it has a well-developed infrastructure. The mineral industry was very important to the country and played an increased role in the economy in 2009, both domestically and internationally.

The Government announced that it had initiated a plan to reform the Mining Act of 1965 to ensure that prospecting and mining are performed in an ecologically, economically, and socially sustainable manner. The new Mining Act would take into account environmental issues, as well as the rights of citizens, landowners, and municipalities to influence decisionmaking. Under the revised Act, the right to exploit a deposit would be based on a mining permit, and the review of permits would be more comprehensive than in the original Act. The mining operator's termination and after-care obligations would also be more extensive, and the mining operator would be required to lodge a security deposit to ensure that its after-care obligations are fulfilled. The Government would continue to provide access to high-quality geologic databases and other available exploration services (Mining Journal, 2009a, p. 20).

Minerals in the National Economy

The Government offered the mineral resource industry a favorable investment and operating environment. There continued to be significant potential for new discoveries of mineral commodities to be made because areas of the country had not been well-explored. Activities of the mineral industry in 2009 were concentrated on the production of base metals, diamond, gold, industrial minerals, and platinum-group metals. The global economic downturn reduced capital investment in mineral exploration from the private sector. The metal industry was one of the key sectors of the national economy, and its output was largely exported (Mining Journal, 2009b).

Production

The production of mineral commodities, although decreasing for some commodities (including refined cobalt, refined copper, mercury, and steel), continued to be significant. In 2008 (the latest year for which data were available), metals were mined from four mines that produced a combined 3.7 million metric tons (Mt) of ore; industrial minerals were mined from 40 mines and quarries that produced a combined 15.9 Mt of ore. The major industrial minerals produced were apatite, carbonates, and talc (Mining Journal, 2009b). Finland was the leading talc producer in Europe and the fourth ranked talc producer in the world (Virta, 2009). Data on mineral production are in table 1.

Structure of the Mineral Industry

The mineral resource companies were mostly privately owned. The Government held an equity position in some of the major mineral commodity companies, however, such as Kemira Oyj, Outokumpu Oyj, and Rautaruukki Oy. The mineral industry operated on a free market basis. The companies' major facilities and their annual capacities are listed in table 2.

Commodity Review

Metals

Copper.—Vulcan Resources Ltd. of Australia completed its feasibility study, with positive results, on its Kylylahti project in eastern Finland. The company reported that it intended to merge with Universal Resources Ltd. of Australia. Should the merger happen, it would create a significant copper group with advanced development-stage projects in Queensland, Australia, and in Finland (Universal Resources Ltd., 2009).

Gold.—Lappland Goldminers AB reported that it achieved its highest quarterly production in 2009 from the Pahtavaara Mine. In the fourth quarter, 211 kilograms (kg) was produced. For the full year, 688 kg was produced. Ore mined was 307,009 metric tons (t) at a grade of 1.64 grams per metric ton (g/t) gold. The annual production was marginally below that planned for the year; however, recoveries increased to 87% from a planned 85%. Gold grades in November and December exceeded 2 g/t of mined ore (Lappland Goldminers AB, 2010).

Dragon Mining Ltd. of Australia was engaged in gold exploration, development, and mining projects, which included the Jokisivu Mine and the Orivesi Mine. Dragon Mining announced the results of a drilling program to test the depth extensions of the Kujankallio deposit at the Jokisivu Mine. Open pit mining commenced at Kujankallio in 2009. Results from drill holes designed to examine about 300 meters (m) of strike length at the Kujankallio deposit returned significant intercepts, including 2.4 m grading 6.45 g/t gold, 3.75 m grading 29.73 g/t, 6.65 m grading 13.90 g/t, 3.1 m grading 9.08 g/t, 3.9 m grading 6.45 g/t, and 7.35 m grading 6.29 g/t. New intercepts were also received at the Basin 3 prospect, which is located 100 m northwest of the Kujankallio open pit. The best intercept from the five holes completed was 1.85 m grading 22.29 g/t gold (Dragon Mining Ltd., 2009a).

The region is also host to the company's Orivesi Mine. Both the Jokisivu Mine and the Orivesi Mine are located in the Paleoproterozoic Svecofennian (Tampere) schist belt in southern Finland. The Orivesi Mine had been in production from 1994 until 2003 and produced about 13,000 kg of gold from 1.4 Mt of ore from near-vertical pipe-like lodes at Kutema. Dragon Mining recommenced remnant mining in mid-2007 and was continuing in 2009 from the Kutema decline. A project to deepen the mine to 820 m was under consideration, and

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the company expected to be make a decision in 2010 (Dragon Mining Ltd., 2009b).

Agnico-Eagle poured the first gold from its Kittila Mine in January; this was Agnico-Eagle's first mine to open outside of Canada. The Kittila Mine has estimated proven and probable gold reserves of 21.4 Mt grading 4.7 g/t gold. The mine was expected to produce 3,534 kg of gold in 2009. Agnico-Eagle announced that it had budgeted $16 million for exploration spending in 2009 on resource-to-reserve conversion at Kittila and on other exploration around the current reserves; this was the largest ongoing exploration program for the company (Agnico-Eagle Mines Ltd., 2009b).

Initially, the Kittila ore bodies were being mined from two open pits—the Roura and the Suuri—followed by underground operations to mine the ore zones at depth. Surface mining was expected to last for 5 years. Underground mining was planned to commence in 2010 by open stoping followed by delayed backfill (Agnico-Eagle Mines Ltd., 2009a).

Lithium.—In mid-2009, Nortec Ventures Corp. of Canada changed its name to Nortec Minerals Corp. and announced that it was granted two claim reservations totaling 317 hectares (ha) for two lithium targets in the Tammela district in southwestern Finland. The lithium mineralization in this pegmatite region, particularly in the Hirvikallio and the Kietyönmäki areas, occurs as swarms of lithium-bearing pegmatite dykes. The two claim reservations were collectively known as the Tammela lithium project (International Mining, 2009a, p. 50).

Nickel.—Belvedere Resources Ltd. announced that Finn Nickel OY had decided to initiate voluntary bankruptcy proceedings but that the proceedings would not affect the solvency of Belvedere Resources or Belvedere Resources Finland OY. Belvedere Resources Finland holds the gold resources of the group. Finn Nickel's main assets included the Hitura and the Särkiniemi nickel mines, the Hitura and the Luikonlahti processing plants, the permitted Hautalampi cobalt, copper, and nickel project, and a number of exploration properties (Belvedere Resources Ltd., 2009).

The Kevitsa nickel deposit, which is located in northern Finland, was one of the world's major undeveloped nickel sulfide deposits. In April 2008, First Quantum Minerals Ltd. of Canada and Scandinavian Minerals Ltd. entered into an agreement in which First Quantum would acquire all the outstanding shares of Scandinavian Minerals. In November 2008, Quantum Minerals announced that it was proceeding with the development of the Kevitsa project and with the construction of an open pit mine and 5-million-metric-ton-per-year (Mt/yr) ore treatment plant. Estimated proven and probable reserves were 107 Mt at a grade of 0.29% nickel. Production was scheduled for mid-2012 (First Quantum Minerals Ltd., 2009).

Talvivaara Mining Company plc announced that it had shipped its first nickel sulfide ore from its Talvivaara Mine to Norilsk Nickel Harjavalta in Finland. The production target for 2010 remained unchanged; there were plans for expansions to 45,000 t of nickel ore in 2011 and 50,000 t of nickel ore in 2012 (International Mining, 2009b, p. 43).

Vulcan Resources announced updated resource estimates for three deposits within the Suomussalmi Greenstone Belt which forms the northern part of the Kuhmo nickel project area. These three deposits—the Hietaharju, the Peura-aho, and the Vaara—were estimated to host a combined 37,300 t of contained nickel, 17,855 t of contained copper, 1,964 t of contained cobalt, and 3,685 kg of contained palladium. The 2009 resource estimate for the Vaara deposit was 8.2 Mt grading 0.32% nickel 0.02 copper, 0.01 cobalt, 0.14 palladium; for the Hietaharju deposit, 1.1 Mt grading 0.80% nickel, 0.04% copper, 0.05% cobalt, and 1.17 g/t palladium; and for the Peura-aho deposit, 495,000 t grading 0.60% nickel, 0.27% copper, 0.04% cobalt, and 0.58 g/t palladium in about 9.82 Mt total ore. Vulcan Resouces had applied for a mining license at Hietaharju (Vulcan Resources Ltd., 2009).

Industrial Minerals

Diamond.—Sunrise Diamonds plc of the United Kingdom announced that it had entered into an agreement with Nordic Diamonds Ltd. to acquire 100% ownership of Nordic's Kaavi-Kuopio claims in Finland. The claims covered 14 of the 25 known kimberlites in Finland's main diamondiferous area at Kaavi-Kuopio, including Kimberlites 10, 14, and 17 where Nordic had completed diamond sampling, and a number of other pipes containing diamond grades of economic interest (Resource Investor, 2009).

Wollastonite.—Nordkalk Corp., which was the only European producer of wollastonite in 2009, announced that it had launched a new generation of high-aspect-ratio wollastonite fillers. The name of the new product is Harwold wollastonite and it was designed for thermoplastic and thermoset applications. Wollastonite ($CaSiO_3$) is a calcium metasilicate with the theoretical composition of 48.3% calcium oxide and 51.7% silicon dioxide; it is used mainly in the production of abrasives, ceramics, elastomers, plastics, and some metallurgical processes (Nordkalk Corp., 2009).

Mineral Fuels and Related Materials

Fingrid Oyj had a crucial role in the Finnish power system. By virtue of the Electricity Market Act, Fingrid was responsible for the functioning of the power system at a national level. Fingrid announced that it was ready to export 350 megawatts of electricity to Russia beginning in 2010 but that first new rules regulating the trade between Finland and Russia would have to be made. In 2009, it was possible for the Nordic countries only to import electricity from Russia, not to export it to Russia, but this was expected to change in 2010. Russia was conducting technical tests, and the results would show what the next step in the development of a two-way connection between Finland and Russia would likely be (Barentsobserver.com, 2009).

Uranium.—Mawson Resources Ltd. of Canada announced that it had been granted a 96-ha exploration claim over the historical Nuottijarvi uranium deposit in central Finland, which was one of the country's largest known uranium deposits. In 1969, Outokumpu Oyj reported an estimated historical resource at Nuottijarvi of 2.9 Mt grading 0.044% uranium oxide (U_3O_8) based on 43 diamond drill holes for 6,679 m, drilled on a 50-m by 50-m drill pattern. The mineralized body is about 40-m thick, extends from the surface to a vertical depth of 80 m, trends over

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a strike length of more than 400 m, and remains open along strike and at depth. The uranium occurs as uraninite associated with fluorapatite within a 40-m-wide mineralized breccia, hosted by a carbonate-apatite horizon at the contact between quartzite and graphite-bearing phyllite. Mawson announced that it would complete a compliance report and begin metallurgical testing to produce yellowcake in 2010 (Canada Newswire, 2009).

Outlook

Finland has a long mining history and a traditional focus on primary resources, which is expected to continue. Exploration, particularly for gold. is expected to continue at a strong pace. The operating environment for mining companies in Finland is generally favorable for exploration and mining and is expected to remain so. There is a significant potential for the occurrence of various mineral commodities as the Geological Survey of Finland continues to identify metallic and industrial mineral deposits and compile geoscience data.

References Cited

Agnico-Eagle Mines Ltd., 2009a, Mining: Agnico-Eagle Mining Ltd. (Accessed August 3, 2010, at http://www.agnico-eagle.com/English/Our-Business/Operating-Mines/Kittila/Mining-and-Processing/default.aspx.)

Agnico-Eagle Mines Ltd., 2009b, Operations update: Agnico-Eagle Mining Ltd. (Accessed January 5, 2010, at http://www.agnico-eagle.com/English/Our-Business/Operating-Mines/Kittila/OperationsUpdate/default.aspx.)

Barentsobserver.com, 2009, Finland ready to export 350 MW to Russia from 2010: Alexander's Gas & Oil Connections, September 9. (Accessed August 24, 2009, at http://www.gasandoil.com/goc/news/nte93126.htm.)

Belvedere Resources Ltd., 2009, Finn Nickel initiates' voluntary bankruptcy proceedings: Belvedere Resources Ltd., July 13. (Accessed July 13, 2009, at http://www.belvedere-resources.com/english/news/2009/finn-nickel-initiates-voluntary-bankruptcy-proceedings.)

Canada Newswire, 2009, Mawson claim granted over historical resources at Nuottijarvi, Finland: Metals Economics Group, September 28. (Accessed August 29, 2009, at http://services.metalseconomics.com/MineSearch/News.aspx?type=html&newsID=1007952982.)

Dragon Mining Ltd., 2009a, High grade gold intercepts from the Jokisivu gold mine, Finland: Dragon Mining Ltd., October 27, 4 p. (Accessed October 27, 2009, at http://www.dragon-mining.com.au/IMG/pdf/2009-10-27_Exploration_results_from_Jokisivu.pdf.)

Dragon Mining Ltd., 2009b, Orivesi gold mine: Dragon Mining Ltd. (Accessed September 5, 2010, at http://www.dragon-mining.com.au/-Orivesi-Finland-.html.)

First Quantum Minerals Ltd., 2009, First Quantum announces board approval for development of Kevitsa project, Finland: First Quantum Minerals Ltd. news release 09-32, November 30, 5 p. (Accessed January 3, 2010, at http://www.first-quantum.com/i/pdf/NR 09-32 - Kevitsa - FINAL.pdf.)

International Mining, 2009a, Nordic focus—Lithium: International Mining, v. 5, no. 11, November, 51 p.

International Mining, 2009b, Nordic focus—Nickel: International Mining, v. 5, no. 11, November, 51 p.

Lappland Goldminers AB, 2010, Lappland Goldminers releases operating statistics for the fourth quarter 2009 and full year 2009: Lapland Goldminers AB, January 19. (Accessed September 5, 2010, at http://www.lapplandgoldminers.se/system/nyheter.asp?HID=1170&HSID=21554&FID=970&do=show&nyhetsID=1182&NyhetsKategoriID=125.)

Mining Journal, 2009a, Finland strengthens mining base: Mining Journal, November 20, p. 18.

Mining Journal, 2009b, Finland—A supplement to Mining Journal: Mining Journal, February, 11 p.

Nordkalk Corp., 2009, Nordkalk has launched a new generation of wollastonite products: Nordkalk Corp. (Accessed September 4, 2010, at http://www.wollastonite.fi/default.asp?viewID=896.)

Resource Investor, 2009, Sunrise moves to 100% ownership of nordic kimberlites in Finland's Karelian Craton: Resource Investor press release, January 27. (Accessed January 29, 2009, at http://www.resourceinvestor.com/pebble.asp?relid=48986.)

Universal Resources Ltd., 2009, Vulcan Resources and Universal Resources to merge: Universal Resources Ltd., September 3, 1 p. (Accessed September 5, 2010, at http://www.brr.com.au/event/60241/proposed-merger-between-universal-and-vulcan-peter-ingram-chairman-and-managing-director.)

Virta, Robert, 2009, Talc and pyrophylite: U.S. Geological Survey Mineral Commodities Summaries 2009, p. 162-163.

Vulcan Resources Ltd., 2009, Increase in Kuhmo nickel project resources; now a significant emerging nickel province: Vulcan Resources Ltd., 9 p. (Accessed October 23, 2009, at http://www.vulcanresources.com.au/aurora/assets/user_content/File/asx2009/VRL18420_AC.pdf.)

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TABLE 1

FINLAND: PRODUCTION OF MINERAL COMMODITIES[1]

(Thousand metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007	2008	2009[e]
METALS						
Aluminum, metal, secondary	metric tons	34,127	35,773	44,223 [3]	24,706 [3]	14,381 [3]
Chromite:						
Gross weight		571	549	556	614	247 [3]
Cr_2O_3 content:						
Lump ore		82	80	80	85	80
Concentrate		126	125	125	128	125
Foundry sand		5	5	5	5	5
Total		213	210	210	218	210
Cobalt, refined	metric tons	6,158	5,903	5,862	6,301 [3]	4,665 [3]
Copper:						
Concentrate, gross weight	do.	53,489	44,663	47,798	47,077 [3]	49,730 [3]
Mine output, Cu content	do.	15,600 [e]	13,000	13,600	13,000 [e]	13,000
Metal:						
Smelter	do.	177,216	192,235	149,206	174,354	139,710 [3]
Refined	do.	124,994	136,674	109,837	137,953	105,549 [3]
Gold, metal, mine output	kilograms	3,747	5,292	2,727	2,064	1,785 [3]
Iron and steel, metal:						
Pig iron	metric tons	3,056	3,158	2,915	21,171 [r,3]	15,704 [3]
Ferroalloys, ferrochromium		235	243	242	234	123 [3]
Steel, crude		4,738	5,052	4,431	4,418	3,078 [3]
Mercury	kilograms	34,200	22,879	45,195	33,120	6,210 [3]
Nickel:						
Mine output, Ni content	metric tons	3,386	2,985	3,465	4,303	4,400
Metal, electrolytic	do.	34,709	47,469	54,964	43,036	10,304 [3]
Platinum	kilograms	678	711	461	214	265 [3]
Selenium, metal	do.	57,208	70,458	52,459	58,069 [r,3]	66,028 [3]
Silver, metal	do.	24,822	38,428	33,447	59,375 [r,3]	60,019 [3]
Zinc:						
Mine output, Zn content	metric tons	72,474	66,109	72,118	51,900	56,415 [3]
Metal	do.	281,905	282,238	305,543	297,722	295,049 [3]
INDUSTRIAL MINERALS						
Cement, hydraulic		1,537	1,685	1,743	1,633	1,052 [3]
Feldspar	metric tons	52,383	43,187	48,890	45,250	45,000
Lime		470	502	517	482	410 [3]
Mica:						
Unspecified	metric tons	9,473	8,097	11,449	10,706	10,000
Biotite		59	63	58	57	50
Nitrogen, N content of ammonia	do.	73,592	91,356	100,623	73,868	68,379 [3]
Phosphate rock apatite concentrate:[e]						
Gross weight		823 [3]	858 [3]	860	780	660 [3]
P_2O_5 content		300 [3]	325 [3]	325	NA	NA
Pyrite, gross weight		489	495	509	510 [r,3]	679 [3]
Sodium sulfate		26	27	20	22	NA
Stone, crushed:						
Limestone and dolomite:						
For cement manufacture		1,537	1,569	1,764	1,807	1,800
For agriculture		566	657	547	647	640
For lime manufacture		342	328	310	317	325
Fine powders		629	625 [e]	625	650	650
Metallurgical[e]		1	1	1	1	1
Total		3,075	3,161	3,247	3,422	3,420
Quartz silica sand		2,860	3,003 [r]	2,958 [r]	3,160	2,241 [3]

See footnotes at end of table.

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TABLE 1—Continued

FINLAND: PRODUCTION OF MINERAL COMMODITIES[1]

(Thousand metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007	2008	2009[e]
INDUSTRIAL MINERALS—Continued						
Sulfur:						
S content of pyrite[e]		270	250	250	250	250
Byproduct:[e]						
Metallurgy		300	300	300	300	300
Petroleum		70	70	70	70	70
Total		370	370	370	370	370
Sulfuric acid		1,057	971	904	956 [3]	851 [3]
Talc		508	559	536	528	500
Wollastonite	metric tons	15,950	16,200	16,364	15,600 [e]	16,000
MINERAL FUELS AND RELATED MATERIALS						
Peat:						
For fuel use		7,696	6,919	8,671	6,933 [r,3]	5,576 [3]
For agriculture and other uses		778	896	1,145	1,552 [r,3]	876 [3]
Petroleum refinery products	thousand 42-gallon barrels	78,796	79,835	89,130	95,325	95,000

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. do. Ditto. NA Not available.

[1]Table includes data available through August 31, 2010.

[2]In addition to the commodities listed, granite and soapstone were produced, but available information is inadequate to make reliable estimates of output.

[3]Reported figure.

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TABLE 2
FINLAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Ammonia		Kemira Oyj (Government, 98%)	Plant at Oulu	75
Apatite		Kemira Agro Oyj (Government, 98%)	Mine and plant at Siilinjarvi	8,000
Cadmium, metal		Outokumpu Oyj (Government, 40%, and private investors, 12.3%)	Smelter at Kokkola	1
Cement		Finncement Oy (Irish Cement Ltd., 100%)	Plants at Lappeenranta and Parainen	1,020
Chromite		Outokumpu Oyj (Government, 40%, and private investors, 12.3%)	Mine at Kemi	1,000
Cobalt		OM Group Inc.	Plant at Kokkola	NA
Copper:				
Ore, Cu content		Inmet Mining Corp.	Mines at Pyhasalmi, Saattopora, and Hitura	10
Metal		Boliden Harjavalta AB (Boliden AB, 100%)	Smelter at Harjavalta	160
Do.		do.	Refinery at Pori	125
Feldspar		SP Minerals Oy (Partek Corp., 50.1%, and SCR-Silbeco SA, 49.9%)	Mine and plant at Kemio	50
Ferrochrome		Outokumpu Oyj (Government, 40%, and private investors, 12.3%)	Smelter at Tornio	250
Gold:				
Ore, Au content	metric tons	Dragon Mining N.L.	Mine at Orivesi	4
Do.	do.	Scanmining Corp.	Pahtavaara Mine near Sodankyla	3
Metal	do.	Outokumpu Oyj (Government, 40%, and private investors, 12.3%)	Smelter at Pori	4
Limestone		Nordkalk Corp. (Rettig Group, 100%)	Mines at Lappeenranta, Pargas, and Parainen	1,500
Do.		Rauma-Repola Oy	Mine at Tornio	300
Mercury	metric tons	Outokumpu Oyj (Government, 40%, and private investors, 12.3%)	Smelter at Kokkola	150
Mica		Kemira Oyj (Government, 98%)	Mine at Siilinjarvi	10
Nickel:				
Ore, Ni content		Belvedere Resources Ltd.	Mine at Hitura	3
Metal		Boliden Harjavalta AB (Boliden AB, 100%)	Smelter at Harjavalta	32
Do.		do.	Refinery at Harjavalta	50
Petroleum products	thousand barrels per day	Neste Oil Oyj (Government 50%)	Plants at Naantali and Porvoo	NA
Phosphate-apatite		Kemira Oyj (Government, 98%)	Mine at Siilinjarvi	700
Do.		Outokumpu Oyj (Government, 40%, and private investors, 12.3%)	Mine at Pyhasalmi	800
Quartz and quartzite		SP Minerals Oy (Partek Corp., 50.1%, and SCR-Silbeco SA, 49.9%)	Mines at Kemio and Nilsia	250
Selenium	metric tons	Outokumpu Oyj (Government, 40%, and private investors, 12.3%)	Smelter at Pori	35
Silver	do.	do.	do.	30
Steel:				
Crude		Rautaruukki Oy (Government, 41.8%)	Plants at Halikko, Hameenlinna, Kankaanpaa, and Raahe	2,100
Do.		Fundia AB (Norsk Jenverk AS of Norway, 50%, and Rautaruukki, 50%)	Plants at Aminnefors, Dalsbruk, and Koverhar	850
Do.		Ovako Oy (SKF, 50%; Wartsila, 25%; Fiskas, 20%)	Plant at Imatra	600
Stainless		AvestaPolarit	Plant at Tornio	550
Talc		Mondo Minerals Oy (BHP Billiton, 50%, and Plüss-Staufer AG, 50%)	Mines at Lahnaslampi, Lipsavaara, and Horsmanaho	500
Wollastonite		Nordkalk Corp. (Rettig Group, 100%)	Mine and plant at Lappeenranta	40
Zinc:				
Ore, Zn content		Inmet Mining Corp.	Mine at Pyhasalmi	25
Metal		Outokumpu Oyj (Government, 40%, and private investors, 12.3%)	Smelter at Kokkola	260

NA Not available. Do., do. Ditto.

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The Mineral Industry of France

By Alberto Alexander Perez

In 2009, France's gross domestic product (GDP) based on purchasing power parity of $2.097 was lower than the GDP of $2.15 trillion of the previous year although France continued to be the country with the third largest GDP in the European Union (EU) after Germany and the United Kingdom. The output value of France's entire industrial sector accounted for about 19.3% of its GDP in 2009. The country was a significant processor of raw mineral materials and a manufacturer of industrial and consumer durable goods. France's heavy industries, which, among other product categories, produced automotive and aviation products, chemicals, and machine tools for domestic consumption and export, relied mainly on imported metal ores and concentrates and on imported industrial minerals and mineral fuels (U.S. Central Intelligence Agency, 2010).

The economic downturn that affected the world had a significant effect on France's industries across the board. The recession in France was less severe than that of other countries with a similar GDP, however, because of the country's generous social net that protected domestic demand and its limited reliance on exports. Recovery, however, was expected to be rather slow precisely for the same reasons (International Monetary Fund, 2010).

Minerals in the National Economy

During the past 20 years, France gradually transitioned from being a producer and processor of mineral commodities to being mainly a processor. By 2009, most mining, and certainly mining of metals, had ceased in metropolitan France. Owing to the size and structure of France's economy, the upstream input of minerals was key to the continued maintenance and growth of the country's heavy industries. In 2009, France reported a net negative trade balance with fellow members of the EU of about $85,800 million[1] and a net positive balance with nonmembers of $10.9 million; it had a net negative total trade balance of $74.9 million (Eurostat, 2010a, p. 228-237).

Government Policies and Programs

The French Government's trend towards to taking a smaller role in regulating private industry seemed to decrease as the recession prompted the Government to take direct action to try to stimulate the economy. This reversal is similar to what happened in other countries in the world, including the United States, during 2009. The French Government created the Fonds Stratégique d'Investissement (FSI), or strategic investment fund, to direct Government investments in private industry. The FSI planned to invest a total of $2.78 billion per year in private industry (Economist, The, 2009).

The Ministry of Ecology and Sustainable Development was responsible for overseeing and regulating such environmental issues as agricultural runoff, air pollution from industrial and vehicle emissions, forest damage from acid rain, and water pollution from mining, mineral processing, and urban waste. The Government had created the Agency for Industrial Innovation [l'Agence de l'Innovation Industrielle (AII)] in June 2005. In 2008, the AII was integrated into a new association called OSEO that was created to fund and help businesses, particularly small-and medium-size businesses, develop and finance innovation. In 2009, OSEO received the approval of the French President to invest $2.08 billion in technological development and research and entrepreneurship. An important aspect of this investment was its emphasis on the promotion and development of new technologies by small- and medium-sized businesses that otherwise would not have access to funds to develop their research (OSEO, 2010).

Production

In 2009, the mineral industry of France trended generally toward decreased production owing to the drop in the international prices of many commodities combined with an increase in energy costs. Alumina output decreased by 41%; silicon metal, by 40%; secondary aluminum, by 33.9%; pig iron, by 28.7%; crude steel, by 28.2%; hydraulic cement, by 14.4%; and primary aluminum, by 11.3%. There were also reductions in the output of silicomanganese (by 10%), crude petroleum (6.9%), and ferromanganese (2%). Some minerals showed increases in the volume of production, in particular, industrial minerals, which included an increase of 271% in the production of nitrogen, 123% in the production of chalk, 43.1% in the production of industrial sands, and 8.9% in the production of granite. Other significant increases or decreases shown in table 1 and not mentioned here might be subject to future revisions as estimated production data are revised (table 1).

Mineral Trade

Most of France's demand for fuel and nonfuel mineral raw materials was met by imports. The major commercial partners of France were all members of the EU and included Belgium, Germany, Italy, and Spain. The leading non-EU commercial partner of France was the United States. In 2009, exports from France to other countries in the EU[2] included nonferrous metals,[3] which were valued at $4.01 billion; nonmetallic mineral

[1]Where necessary, values have been converted from euro area euros (€) to U.S. dollars (US$) at an average exchange rate of €.719=US$1.00.

[2]In the European Commission's official reports, exports from one member country to other countries within the European Union (EU) are referred to as "dispatches," and imports by a member country from other countries in the EU are referred to as "arrivals."

[3]The classifications stated are from the United Nation's Statistics Division's Standard International Trade Classification, Revision 4 (series M, no. 34, rev. 4, March 2006).

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manufactures, $3.49 billion; metalliferous ores and metal scraps, $2.56 billion; and crude minerals, excluding coal, crude oil and precious stones, $534 million. Imports by France of goods originating from other countries in the EU included manufactured metals valued at $11.77 billion; nonferrous metals, $5.82 billion; and metalliferous ores and metal scrap, $1.44 billion. In contrast, France's leading mineral industry imports, in terms of value, from a non-EU country, not including mineral fuels, were manufactured metals ($2.98 billion) and nonferrous metals ($1.99 billion). The leading mineral exports to non-EU countries were iron and steel and manufactured metals, which were valued at $4.35 billion and $3.98 billion, respectively (Eurostat, 2010a, p. 106-108, 114-116, 122-124,130-132).

The most significant component of France's mineral trade in 2009 was the net imports of mineral fuels; France imported 72.25 million metric tons (Mt) of crude petroleum, which was a decrease of 13.5% compared with the level of crude petroleum imports in 2008. Of this amount, France imported at least 32% from the Commonwealth of Independent States, principally from Azerbaijan, Kazakhstan, and Russia. At least 16% of French crude petroleum came from Africa; 13%, from Norway; 8%, from Saudi Arabia; 4%, from Iran; and 3%, from Iraq. The remaining 24% came from other sources.

France continued to be a net importer of petroleum products. The country imported 37.46 Mt of petroleum products in 2009, which was an increase of 10.48% compared with that of 2008, and exported 22.45 Mt, which was a decrease of 18.79% compared with that of 2008 (Eurostat, 2010b, p. 2-5, 8).

Structure of the Mineral Industry

Although France continued to maintain state monopolies in a number of sectors of the economy, principally in the energy production and transportation sectors, state ownership of the mineral sector was minimal. In 2009, the French Government maintained partial ownership of the country's electricity-generating and natural gas production and distribution facilities, as well as rail and public transportation systems in most French cities. Table 2 provides data on the major French-owned enterprises that produced metals, industrial minerals, and mineral fuels in 2009.

Commodity Review

Metals

Aluminum.—In 2009, France's output of primary aluminum decreased by 11.3%, and that of secondary aluminum decreased by 34% (table 1). Rio Tinto Ltd. was the country's sole producer of primary aluminum. Rio Tinto also operated facilities for the production of alumina and aluminum semimanufactures. At the end of 2008, Rio Tinto closed the Gardanne refinery and ceased production of smelter-grade alumina, although it continued to produce specialty alumina at the Gardanne specialty alumina plant (Rio Tinto Ltd., 2010a, p. 84; 2010b).

Cobalt.—Orrion Chemicals Group expected increased demand for cobalt chemicals, and the group's CEO forecasted that the company would be producing at capacity levels by May. Orrion's subsidiary Orrion Chemicals Metalchem (OCM) operated the former Pharmacie Central de France (PCF) facilities which it had purchased in March; OCM expected to recover 80% to 90% of PCF's historical commercial activity in France and to recover its share of the business in the rest of Europe as well (Metal Bulletin, 2009a).

Copper.—Nexans S.A. announced in September that, owing to market conditions, it would close its copper wire rod plant in Chauny. The plant had a production capacity of 300,000 metric tons per year (t/yr) of copper wire (Metal Bulletin, 2009b).

Ferroalloys.—The Brazilian company Vale Group invested $34.7 million in its subsidiary Vale Manganese France S.A., which was located in Dunkerque. The company planned to rebuild the electric arc furnace that had been damaged during the previous summer. The plant had the capacity to produce 140,000 t/yr of ferromanganese. The company did not begin production on the plant until April because of the work on the furnace (Bouet, 2009).

Grupo Ferroatlantica, S.L. of Spain extended the winter shutdown of its French silicon and silicon alloy plants owing to slow demand but resumed operations in April. Ferroatlantica's subsidiary Ferropem S.A. also closed its silicon furnace for an extended winter shutdown of 4 months beginning in December 2008. Ferroatlantica's French production of silicon metal and silicon alloys was expected to be 40% lower in 2009 than in 2008 (Metal-Pages, 2009).

Iron and Steel.—France's output of pig iron decreased by 28.7% to 8.1 Mt, which continued a trend of decreased production. Crude steel production decreased by 28.2% to 12.8 Mt, which also continued the trend toward decreased production (table 1). Crude steel consumption decreased by 31.4%, which was the equivalent of slightly more than 5.6 million metric tons per year (Mt/yr) (World Steel Association, 2010, p. 90).

ArcelorMittal of Luxembourg announced in July that it was restarting its blast furnace in Florange, France. The plant, which had been closed since May owing to low demand from key automobile and construction sector customers, was back in production in August (Reuters, 2009).

Nickel.—Orrion, through OMC, stated that the volatility in the price of nickel had not hampered Orrion's business because the company had been able to pass increased costs on to its customers, thus retaining the profitability in the production of the allotting metal. Orrion also stated that it would produce at capacity at its former PCF operations at Aubenas in the south of France (Metal Bulletin, 2009b).

Industrial Minerals

France produced a broad variety of industrial minerals. In 2009, Imerys S.A., which was a major French producer of industrial minerals, mined and processed ball clays, carbonates, feldspar, and red clays domestically and from deposits in such countries as China, Germany, Spain, the United States, and Vietnam for domestic use and export (Imerys S.A., 2010, p. 8-11).

Cement.—In 2009, cement consumption in France dropped by 15.9% compared with that of 2008 owing to a 7.1% decrease in the total construction sector output. This trend was expected

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to continue into 2010 with a further decline in consumption of between 3% and 5%. France's principal cement manufacturers were Lafarge S.A. and Société des Ciment Français, which was a subsidiary of Italcementi S.p.A. of Italy. In addition to their cement-producing facilities in France, both companies had major capital assets abroad. The other important producers of cement in France were the Vicat Group, which had five plants with a total cement production capacity of 6 Mt/yr, and Ciments d'Origny, which had six plants and a total cement production capacity of 4.2 Mt/yr (Cembureau, 2010, p. 7).

Mineral Fuels and Other Sources of Energy

Of the total amount of primary energy consumed by France in 2009, 48.2% was electricity generated by hydroelectric, photovoltaic, thermal electric, nuclear, and wind power facilities, which was a decrease of 5.5% from 2008. Although energy consumption decreased by 5.2%, the consumption of renewable energy increased to 6.2% of total energy consumption in 2009. Nuclear energy accounted for an estimated 94.6% of primary electricity production. The principal sectors that consumed energy in France were the residential sector, which accounted for 44% of the total energy consumption in the country; the transportation sector, 31.9%; the manufacturing industry [as defined by the Institut National de la Statistique et des Études Économiques (INSEE)], 18.7%; the steel industry, 2.7%; and agriculture, 2.6% (Institut National de la Statistique et des Études Économiques, 2010).

Natural Gas and Petroleum.—In 2009, France's domestic production of crude petroleum decreased compared with the output in 2008 by an estimated 6.9%. The production of liquefied petroleum gas decreased by an estimated 2.5%, which continued the trend of a substantial production decline since 2005. Domestic production of petroleum products decreased by about 7.1% in 2008 (the latest year for which production data were available) compared with that of 2007 (U.S. Energy Information Administration, 2010).

Nuclear Energy.—In 2009, France had 59 active nuclear powerplants, which produced 94.6% of the primary electricity in France. Group Areva, which was the French Government-owned nuclear technology company, was building the first nuclear reactors in Western Europe in 20 years. Areva's reactor, which is called a Third Generation, or EPR (Evolutionary Power Reactor, or European Pressurized Reactor, as it is known in Europe), had helped the company compete for new construction contracts for nuclear powerplants in France and abroad. Delays in the construction of already contracted reactors, however, had hampered the company's ability to promote the technology to gain new investment contracts.

Construction of the International Thermonuclear Experimental Reactor (ITER) complex began in 2008 in Cadarche in the Provence-Alpes-Côte d'Azur region. The seven participants in the ITER project were China, the EU, India, Japan, the Republic of Korea, Russia, and the United States. The project is based in the toroidal magnetic field (Tokamak) reactor, and seeks to change nuclear power production from nuclear fission-generated energy to fusion-generated energy (International Thermonuclear Experimental Reactor, 2009).

Outlook

France's nuclear industry is expected to continue to grow. Future investment in the development and promotion of the nuclear energy sector is assured by the implicit support of the French Government. France is likely to continue to produce consumer and producer durables and such intermediate products as ferrous and nonferrous metals and semimanufactures, construction materials, and chemicals, although much of its ores and mineral intermediate manufactured goods will continue to be imported. France has made considerable investments in renewable energy, and the share of consumption of total energy provided by renewable energy is expected to grow as the Government, through OSEO, continues to invest and promote this sector. Nuclear energy appears to be the focus of the Government's energy generation strategy for the near future, however.

References Cited

Bouet, Adele, 2009, 25 millions d'euros pour Vale Dunkerque: UsinneNouvelle, January 22. (Accessed October 28, 2010, at http://www.usinenouvelle.com/article/25-millions-d-euros-pour-vale-dunkerque.156657.)

Cembureau, 2010, Activity report 2009: Brussels, Belgium, Cembureau, 46 p.

Economist, The, 2009, Government and business in France—Dirigisme de rigueur: The Economist, December 30. (Accessed November 2, 2010, at http://www.economist.com/node/15176474?story_id=15176474.)

Eurostat, 2010a, France—Trade balance—Monthly statistics: European Commission, no 06/2010, 487 p. (Accessed October 17, 2010, at http://epp.eurostat.ec.europa.eu/portal/page/portal/external_trade/documents/ExtraIntraMonthlyEUTrade_ENVol06-2010.pdf.)

Eurostat, 2010b, Statistical aspects of the oil economy in 2009: European Commission, 9 p. (Accessed October 19, 2010, at http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-QA-10-031/EN/KS-QA-10-031-EN.PDF.)

Imerys S.A., 2010, Reference document including financial annual report 2009: Imerys S.A., 230 p. (Accessed November 4, 2010, at http://www.imerys.com/scopi/Group/imeryscom/imeryscom.nsf/pagesref/NDEN-844E4C/$File/DDR_2009_VA.pdf.)

Institut National de la Statistique et des Études Économiques, 2010, Consommation d'énergie primaire par type d'énergie et par secteur: Institut National de la Statistique et des Études Économiques. (Accessed September 30, 2010, at http://www.insee.fr/fr/themes/tableau.asp?reg_id=0&ref_id=NATTEF11347.)

International Monetary Fund, 2010, France—Less severe recession but tepid recovery: International Monetary Fund, July 31. (Accessed October 30, 2010, at http://www.imf.org/external/pubs/ft/survey/so/2009/car073109a.htm.)

International Thermonuclear Experimental Reactor, 2009, ITER history: International Thermonuclear Experimental Reactor, 1 p. (Accessed January 21, 2010, at http://www.iter.org/PROJ/Pages/ITERHistory.aspx.)

Metal Bulletin, 2009a, European Cu market spooked on news Nexans will shut Chauny wire plant: Metal Bulletin, September 23. (Accessed October 28, 2010, at http://www.metalbulletin.com/Article/2301585/European-Cu-market-spooked-on-news-Nexans-will-shut-Chauny-wire.html.)

Metal Bulletin, 2009b, Orrion sees improving demand for cobalt and nickel chemicals: Metal Bulletin, September 28. (Accessed October 28, 2010, at http://www.metalbulletin.com/Article/2304692/Orrion-sees-improving-demand-for-cobalt-and-nickel-chemicals.html.)

Metal-Pages, 2009, Ferroatlantica cuts more silicon production: Metal-Pages Ltd., June 22. (Accessed October 28, 2010, at http://www.metal-pages.com/logon.php?go=/news/story/40287.)

OSEO, 2010, Emprunt national—1,5 milliard d'euros pour OSEO: OSEO. (Accessed October 30, 2010, at http://www.oseo.fr/a_la_une/actualites/emprunt_national_1_5_milliard_d_euros_pour_oseo.)

Reuters, 2009, ArcelorMittal to reopen French blast furnace: Thompson Reuters, July 15. (Accessed October 15, 2010, at http://www.reuters.com/article/idUSLF18564720090715.)

Digitized by Google

Rio Tinto Ltd., 2010a, Annual report 2009: Rio Tinto Ltd., 240 p. (Accessed October 29, 2010, at http://www.riotinto.com/annualreport2009/pdf/rio_tinto_full_annualreport2009.pdf.)
Rio Tinto Ltd., 2010b, Rio Tinto Alcan curtails production and cuts costs in response to global economic conditions: Rio Tinto Ltd. (Accessed October 29, 2010, at http://www.riotintoalcan.com/ENG/media/media_releases_1667.asp.)
U.S. Central Intelligence Agency, 2010, France, *in* The world factbook: U.S. Central Intelligence Agency. (Accessed September 15, 2010, at https://www.cia.gov/library/publications/the-world-factbook/geos/fr.html.)
U.S. Energy Information Administration, 2010, France energy profile: U.S. Department of Energy. (Accessed November 1, 2010, at http://tonto.eia.doe.gov/country/country_energy_data.cfm?fips=FR.)
World Steel Association, 2010, Steel statistical yearbook 2010: Brussels, Belgium, World Steel Association, 122 p.

TABLE 1

FRANCE: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007	2008	2009
METALS						
Aluminum:						
Bauxite, gross weight[e, 3]	thousand metric tons	168	168	160	160	160
Alumina, metallurgical, gross weight[e]	do.	200	200	500	592 r	348
Metal:						
Primary	do.	540 r	442	428	389 r	345
Secondary	do.	223 r	231 r	225 r	209 r	138
Antimony, metal, including regulus[e]		500	500	500	500	500
Cadmium metal[e]		100	100	50	50	50
Cobalt, metal:						
Powder[e]		500	500	500	500	500
Chloride		280	256	305	310	310 e
Gold, mine output, Au content[e]	kilograms	1,500	1,500	1,500	1,500	1,500
Iron and steel:						
Metal:						
Pig iron	thousand metric tons	12,705	13,013	12,425	11,372 r	8,104
Ferroalloys, electric furnace:[e]						
Ferromanganese	do.	113 r	137 r	144 r	47 r	46
Ferrosilicon	do.	100	100	100	100	20
Silicomanganese	do.	52 r	63 r	65 r	60	54
Silicon metal	do.	75	85	85	85	51
Other	do.	65	60	60	60	60
Total	do.	405 r	445 r	454 r	352 r	231
Steel:						
Crude	do.	19,481	19,857	19,252	17,900	12,840
Hot-rolled	do.	16,566	17,028 r	16,903 r	14,746 r	11,382
Lead, refined:						
Primary		--	4,039	--	--	4,640
Secondary		104,979	100,195	88,000 e	82,000 e	82,000 e
Total		104,979	104,234	88,000 e	82,000 e	86,600 e
Nickel, refinery products, Ni content[4]		12,536	13,700	16,400 e	13,400 e	14,000
Silver:[e]						
Mine output, Ag content	kilograms	700	700	700	--	--
Metal, Ag content of final smelter products	do.	400	400	400	--	--
Tin, secondary[e]		1,500	1,500	1,500	1,500	1,500
Zinc metal, including slab and secondary		210,000	120,000	129,000	118,900	118,000 e
INDUSTRIAL MINERALS						
Abrasives, undifferentiated[e]		300	272	272	270	270
Barite, $BaSO_3$ equivalent[e]		75,000	30,000	--	--	--
Cement, hydraulic	thousand metric tons	21,277	22,300 r	22,300 e	21,400 r	18,300
Clays:						
Kaolin and kaolinitic clay (marketable)	do.	293	300 e	307	624 r	519
Refractory clay, unspecified[e]	do.	15	15	15	15	15

See footnotes at end of table.

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TABLE 1—Continued

FRANCE: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007	2008	2009
INDUSTRIAL MINERALS—Continued						
Diamond, synthetic, industrial[e]	thousand carats	3,600	3,600	3,600	3,600	3,600
Diatomite[e]	thousand metric tons	75	75	75	75	75
Feldspar, crude[e]	do.	651 [5]	650	650	650	650
Fluorspar, marketable	do.	53	40 [e]	--	--	--
Gypsum and anhydrite, crude[e]	do.	3,500	3,500	3,500	3,500	3,351 [5]
Kyanite, andalusite, related materials[e]	do.	65	65	65	65	65
Lime, quick and hydrated, dead-burned dolomite[e]	do.	3,400	3,500	4,000	4,000	4,000
Mica[e]		20,000	20,000	20,000	20,000	20,000
Nitrogen, N content of ammonia[e]	thousand metric tons	1,206 [5]	616	800	800	2,970 [5]
Pigments, mineral, natural, iron oxide[e]		1,000	1,000	1,000	1,000	1,000
Phosphates, Thomas slag[e]	thousand metric tons	50	50	50	50	50
Pumice and other natural abrasives[e]	do.	400 [5]	272 [5]	276	270	270
Salt, all sources[e]	do.	6,730 [5]	9,371 [5]	6,140	6,240	6,200
Sodium compounds:[e]						
Soda ash	do.	1,000	1,000	1,000	1,000	1,000
Sodium sulfate	do.	120	120	120	120	120
Stone, sand and gravel:						
Chalk	do.	673	554	583	580 [e]	1,294
Dolomite, crude	do.	974	991	984	980 [e]	777
Granite, crude	do.	255	245	373	370 [e]	403
Limestone, agricultural and industrial	do.	11,590	11,018	11,699	11,700 [e]	8,302
Marble and travertine, crude	do.	121	130	148	150 [e]	150 [e]
Sandstone	do.	33	32	95	95 [e]	109
Slate, crude		5,390	5,703	8,716	8,700 [e]	8,700 [e]
Sand and gravel:[e]						
Industrial sands		5,200	5,200	5,200	5,200	7,442 [5]
Other sand, gravel, and aggregates		165,000	165,000	165,000	165,000	263,530 [5]
Sulfur, all sources[e]		616 [5]	650	650	650	650
Talc, crude[e]	thousand metric tons	416 [5]	420	420	420	420
MINERAL FUELS AND RELATED MATERIALS						
Asphaltic material[e]		20,000	20,000	20,000	20,000	11,675 [5]
Carbon black[e]		200,000	200,000	200,000	200,000	178,777 [5]
Coal, briquets[e]	thousand metric tons	100	100	100	100	100
Coke, metallurgical[e]	do.	4,500	4,500	4,500	4,500	4,500
Gas, natural, marketed	million cubic meters	1,784 [r]	1,840 [r]	1,642 [r]	1,472 [r]	1,444
Petroleum:						
Crude	thousand 42-gallon barrels	7,775	7,604	7,242	7,117 [r]	6,624
Refinery products:						
Liquefied petroleum gas	do.	32,179 [r]	32,167 [r]	30,358 [r]	33,860 [r]	33,000 [e]
Gasoline, all kinds	do.	138,506 [r]	146,709 [r]	142,069 [r]	141,195 [r]	140,000 [e]
Kerosene and jet fuel	do.	43,701 [r]	45,350 [r]	44,293 [r]	44,462 [r]	44,000 [e]
Distillate fuel oil	do.	253,970 [r]	256,043 [r]	259,550 [r]	275,148 [r]	275,000 [e]
Residual fuel oil	do.	76,230 [r]	88,263 [r]	73,803 [r]	73,342 [r]	73,000 [e]
Other products	do.	123,376 [r]	115,858 [r]	115,335 [r]	124,347 [r]	124,000 [e]
Total	do.	667,962 [r]	684,390 [r]	665,408 [r]	692,354 [r]	689,000 [e]

[e]Estimated; estimated data rounded to no more than three significant digits; may not add to totals shown. [r]Revised. do. Ditto. -- Zero.

[1]Table includes data available through October 30, 2010.

[2]In addition to the commodities listed, France produces germanium from domestic ores, but actual output is not regularly reported.

[3]Reprocessed bauxite not for metallurgical use.

[4]Excludes secondary production from nickel-cadmium batteries.

[5]Reported figure.

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TABLE 2
FRANCE: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Alumina, metallurgical		Rio Tinto plc	Plant at Gardanne	700
Aluminum		do.	Aluminum smelters at:	
Do.		do.	Saint-Jean-de-Maurienne, Savoie	120
Do.		do.	Pyrenees, Atlantiques Province	115
Do.		do.	Lannemezan, Hautes-Pyrenees	63
Do.		do.	Dunkerque, Calais du Nord	250
Andalusite		Denain-Anzin Minéraux Réfractaire Céramique	Glomel Mine, Brittany	75
Antimony, metal		Produits Chimiques de Lucette	Plant at Le Genest, Mayeene Province	15
Barite		Barytine de Chaillac	Mine and plant at Chaillac	150
Do.		Société Industrielle du Centre	Mine at Rossigno, Indre Province	100
Cadmium	metric tons	Compagnie Royale Asturienne des Mines	Plant at D'Auby-les-Douai	200
Cement		Four companies, of which the largest are:	80 plants, including:	26,700
Do.		Lafarge S.A.	13 plants, of which the largest (1,160) is located at St. Pierre-la-Cour	9,500
Do.		Société des Ciment Français	9 plants, of which the largest (1,100) is located at Gargenville	7,500
Clay, kaolin		Groupe Mineral Harwanne (GMH)	Kaolin d'Arvor Mine, Quessoy	300
Cobalt, metal	metric tons	Société Métallurgique le Nickel (SLN)	Plant at Sandouville, near Le Havre	600
Copper, metal		Compagnie Générale d'Électrolyse du Palais	Electrolytic plant at Palais-sur-Vienne	45
Do.		Société Française d'Affinage du Cuivre	Smelter at Carrieres-sous-Poissy	11
Diatomite		Ceca S.A.	Mines and plants at Riom-les-Montagnne and St. Bauzille	100
Feldspar		Denain-Anzin Mineraux S.A. (Imerys Group)	Mine and plant at St. Chely d'Apcher	55
Ferroalloys		Comilog Dunkerque (ERAMET, 100%)	Dunkerque	70
Do.		Ferropem S.A. (Ferroatlantica, 100%)	Plants at Anglefort, Laudun-L'ardoise, Petit-Coeur, Gavet, and Saint-Julien-Montdenis	148
Gypsum		S.A. de Matériel de Construction	Mine at Taverny	1,500
Iron and steel, steel		AcelorMittal Group	Dunkerque	6,700
Do.		do.	Fos-sur-Mer	4,200
Do.		do.	Florange	3,200
Do.		Usinor Group	Gadrange, Neuves Maisons	8,400
Mica		Denain-Anzin Minéraux S.A. (Imerys Group)	Mine at Ploemeur, Brittany	160
Natural gas	million cubic meters	Société Nationale Elf Aquitaine (SNEA)	Gasfield and plant at Lacq	20,000
Nickel, metal		Société Métallurgia le Nickel (SLN)	Plant at Sandouville	16
Nitrogen, N content of ammonia		Grande Paroisse S.A.	Plant at Grandpuits	390
Petroleum:				
Crude	42-gallon barrels per day	Société National Elf Aquitaine (SNEA)	Paris Basin oilfields	1,000
Refined	do.	Total S.A.	Refineries at Gonfreville and La Mede	446,000
Do.		Shell-Française	Refinery at Petite Couron	285,000
Do.		do.	Refinery at Berre	270,000
Do.		Société Nationale Elf Aquitaine (SNEA)	Refinery at Feyzin	120,000
Do.		do.	Refinery at Donges	200,000
Do.		do.	Refinery at Grandpuits	96,000
Do.		Ineos Group Ltd.	Refineries at Lavera	175,000
Do.		Esso S.A.	Refineries at Fos-sur-Mer	237,000
Do.		do.	Refineries at Gravenchon	62,000
Do.		Cie. Rhenane de Raffinage (CRR)	Refinery at Reichstett	80,000
Salt		Compagnie des Salins du Midi et des Salines de l'Est (Salins Group)	Mines and plants at Algues Mortes, Dax, Salin de Girad, and Varangeville	2,500
Sulfur		Société Nationale Elf Aquitaine (SNEA)	Byproduct from natural gas, Lacq plant	3,000
Talc		Talc de Luzenac S.A. (Rio Tinto plc, 100%)	Trimouns Mine near Ariege, Pyrenees	350
Uranium, U_3O_8	metric tons	Compagnie Général des Matières Nucléaires (Areva S.A., 100%)	Mines at Limousin and Vendee	1,800
Zinc, metal		Umicore Group	Plants at Auby-les-Douai and Calais	220

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THE MINERAL INDUSTRY OF GEORGIA

By Richard M. Levine

During the Soviet period, a range of mineral commodities were mined in Georgia, including arsenic, barite, bentonite, coal, copper, diatomite, lead, manganese, zeolites, and zinc, among others. The country's metallurgical sector produced ferroalloys and steel. Since then, production of many of these mineral commodities had ceased or been significantly reduced.

Georgia's main role in world mineral supply was serving as a transport route for oil and gas shipments out of the Caspian region to world markets. Three of the new large oil and gas export pipelines that had been or were being constructed in the Caspian region pass through Georgia. These include the Baku-Tbilisi-Ceyhan (BTC) oil transport pipeline, the Baku-Tbilisi-Erzurum (BTE) gas transport pipeline (also called the South Caucasus pipeline), and the Baku-Supsa pipeline (also called the Western Early Oil Route pipeline).

Minerals in the National Economy

The gross domestic product (GDP) of Georgia, according to preliminary reporting, decreased by about 4% in 2009 compared with that of 2008; the decrease was attributed to the global economic crisis. Real GDP increased by 2.1% in 2008 compared with that of 2007. From January through September 2009, industrial output in Georgia decreased by 16.5% compared with that of the same period in 2008 (Interfax Russia & CIS Statistics Weekly, 2010a). In 2009, the total value of output in the mining sector decreased by 45.5%, and the value of output in the refining sector decreased by 16.8% (Interfax Russia & CIS Statistics Weekly, 2010b).

Foreign direct investment in Georgia from January through September 2009 decreased by 60% compared with that of the same period of the previous year. The United Arab Emirates was the leading investor in Georgia from January through September 2009, followed by Egypt, Turkey, and Russia. Russian investment decreased by 50% compared with that of the same period of 2008 (Interfax Russia & CIS Statistics Weekly, 2010a).

Production

Data in table 1 were estimated because 2009 production data for most mineral commodities were not available. Because of the reported decreases in Georgia's GDP, its industrial output, and the value of output in the mining and refining sectors, the production volumes of metals, industrial minerals, and mineral fuels were estimated to have decreased in 2009.

Structure of the Mineral Industry

Georgia's main nonferrous and precious metals mining enterprise was the Madneuli mining and beneficiation complex that mined a large copper-gold and barite deposit. The Madneuli mining and beneficiation complex was transformed in 1994 into the joint-stock company (JSC) Madneuli, in which the controlling interest belonged to the state. In 1997, a joint-venture Georgian-Australian enterprise, Quartzite Ltd., commissioned a gold recovery mill at the Madneuli deposit (World Investment News, 2008). In November 2005, JSC Madneuli was privatized; the tender awarded a 97% stake to Stanton Equities Corp., which was renamed GeoProMining Ltd. and which listed the location of its contact office as Moscow. Stanton Equities also acquired a stake in the Quartzite gold mill and received a 50% stake in Trans-Georgian Resources Ltd., which held the license to the Sakdrisi copper-gold deposit (Interfax Russia & CIS Metals and Mining Weekly, 2007; GeoProMining Ltd., 2008).

Commodity Review

Metals

Copper.—The Madneuli deposit of polymetallic ores is situated in the Bolnisi Region in southern Georgia about 80 kilometers south of Tbilisi near the Armenian and Azerbaijan borders. The main ore types at Madneuli are barite-polymetallic ore, copper-barite ore, copper-zinc ore, gold-copper ore, and quartzite ore (JSC Madneuli, 2010b). JSC Madneuli's main operations included the mining of copper- and gold-bearing ore and the production of copper concentrate and gold as doré, which were sold according to standard international sales contract terms and based on prices quoted by the London Bullion Association and London Metal Exchange, Ltd. The company's primary focus was on copper, and more than 65% of the company revenues came from the sale of copper (JSC Madneuli, 2010a). Production at Madneuli was estimated to have reached 11,000 t of copper in 2008 and 2,000 kilograms of gold (JSC Madneuli, 2010d).

JSC Madneuli used rail transport to send its products to the seaport of Poti, from whence the products were shipped to different countries (Lomtadze, 2008). JSC Madneuli's exports composed about 10% of the total value of Georgia's exports (World Investment News, 2008). Madneuli employed about 1,600 people (JSC Madneuli, 2010d).

The Snowden Group prepared a resource estimate for the Madneuli deposit. The estimate was prepared and classified into indicated and inferred categories. The classification was based upon a number of criteria, including the integrity of the data, the spatial continuity of the mineralization, and the expectation of economic extraction. The Snowden resource estimate was based on existing surface drill-hole information and the results of pit sampling. Snowden considered that the available information for the Madneuli deposit demonstrated sufficient confidence and continuity in the mineralization to define the mineral resource estimate in the indicated and inferred categories. JSC Madneuli reported estimated reserves in the Madneuli pit design, which included factors for dilution and ore loss, to

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be 15.2 million metric tons of ore grading 0.46% copper and 0.52 gram per metric ton gold (JSC Madneuli, 2010c).

Iron and Steel.—After the collapse of the Soviet Union, production at JSC Georgian Steel (the former Rustavi steel works) in southwestern Georgia decreased significantly. In 2007, Thames Steel Ltd. of the United Kingdom purchased the Rustavi plant, but when Thames tried to assert management control by removing local managers, its decisions were blocked by Georgian court injunctions. Subsequently, in November 2009, the steel works was nationalized and sold off to a creditor. Thames Steel was not able to act to save its investment, having been blocked by the courts. Reporting suggested that the plant was being stripped for scrap (Georgian International Media Centre, 2009; Georgian Times, The, 2009).

In 2009, Eurasia Steel of India commissioned a steel mill in Georgia in the city of Kutaisi. The new mill would have the capacity to produce 200,000 metric tons per year (t/yr) of steel-reinforcing bars (rebar) by as early as 2011. The near-term production goal for the plant was to produce 100,000 metric tons (t) of rebar in 2010. Once the plant reaches design capacity, Georgia would be able to meet its entire domestic demand for rebar, which it had been importing, as well as be able to export any surplus rebar to such countries as Armenia, Azerbaijan, Iran, and Turkey (Interfax Russia & CIS Metals and Mining Weekly, 2010).

In 2007, JSW Steel Ltd. of India and Georgian Steel Holding Group of the United Kingdom formed the joint venture GeoSteel LLC, in which Georgian Steel held a 51% equity interest and JSW Steel held a 49% equity interest. In 2009, only a few months after the new Eurasia steel mill was opened, GeoSteel commissioned a rebar mill in the Georgian city of Rustavi. The mill had the capacity to produce 175,000 t/yr of rebar and employed 500 people (Interfax Russia & CIS Metals and Mining Weekly, 2010; Shields, 2010).

The GeoSteel mill was a greenfield project; it included an electric arc furnace for melting scrap, a rolling mill, and a power station. Construction began in 2007 when both the Georgian economy and world steel markets were growing rapidly. Construction was underway in August 2008 when war between Russia and Georgia broke out and was followed by the global financial crisis; both events affected the demand for steel negatively. A representative of GeoSteel stated that consideration had never been given to abandoning the project, although the mill had been operating at only 40% to 70% of its design capacity since it began production and would not be able to approach full capacity until conditions improved. GeoSteel intended to sell most of its output in Georgia but also was planning to export some of the output to Armenia and Azerbaijan. It already had sold some material to Armenia but had not yet been able to penetrate the market in Azerbaijan. A representative of GeoSteel stated that the plant had been operating at a loss (Shields, 2010).

Manganese.—For more than a century, Georgia had mined manganese ore from the Chiatura deposit. A portion of the ore was used to produce manganese ferroalloys at the Zestafoni ferroalloys plant. Stemcor Holdings Ltd. of the United Kingdom owned the manganese mining enterprise Chiaturmanganumi, the Zestafoni ferroalloys plant, and the Vartsikhe hydroelectric powerplant, which were interlinked enterprises engaged in a full cycle of manganese ferroalloy production, from the mining of manganese ore to the production of manganese ferroalloys and the supply of power for these processes (Caucaz Europenews, 2008).

On January 5, 2007, the Minister of Economic Development of Georgia vested the certificate of ownership of Stemcor's enterprises to Georgian Manganese Holding Limited LLC of the United Kingdom, which was a subsidiary of Stemcor. The new owner of the holdings was obligated to invest $100 million within 2 years and to mine no less than 200,000 t of ore, which had to be processed in Georgia. In the long term, the annual production of ore was to increase to 700,000 t, and annual production of ferroalloys was to increase to 400,000 t (Ministry of Economic Development of Georgia, 2007).

Nine mines were operating at Chiaturmanganumi. When Georgian Manganese Holding acquired Chiaturmanganumi, it acquired a 40-year license to mine manganese ore at the Chiatura deposit. Chiaturmanganumi planned to restore operations at an additional six mines and to increase production of manganese concentrate (International Federation of Chemical, Energy, Mine and General Workers' Unions, 2010).

The Metallurgical, Mining, and Chemical Industry Workers' Trade Union of Georgia and its national labor center, the Georgian Trade Union Confederation (GTUC), were in a serious confrontation with managers at the Zestafoni ferroalloys plant and the Georgian manganese mines in Chiatura. Workers were seeking to replace what they claimed to be a company-dominated union with the Metallurgical, Mining, and Chemical Industry Workers' Trade Union, which was established at the Chiatura mines in October 2009. A majority of the 6,000 workers at the Chiatura mines and the Zestafoni ferroalloys plant staged a 3-day strike on April 23-25, 2010. They sought recognition of the Metallurgical, Mining, and Chemical Industry Workers' Trade Union of Imereti Region, which was a branch of the national union, resumption of meaningful bargaining, and permanent work contracts. On behalf of the workers, the Metallurgical, Mining, and Chemical Workers' Trade Union demanded a sizable salary increase and establishment of a minimum salary at the mining complex. The striking union also demanded an improvement in what were asserted to be terrible working conditions and an end to management harassment and intimidation of trade union members. The Union demands for the workers included improvements in occupational safety and health equipment; protective clothing and boots; sanitary break areas; safe food to eat; transparent rules on hours of work; and updated medical facilities (International Federation of Chemical, Energy, Mine and General Workers' Unions, 2010).

The Metallurgical, Mining, and Chemical Industry Workers' Trade Union of Georgia, together with the GTUC, was prepared to launch further and extended strike actions if these demands were not met and stated that such strikes would receive global labor support. The GTUC had filed a complaint with the International Labor Organization (ILO) Committee of Freedom of Association concerning violations at the Zestafoni ferroalloys plant and the Georgian manganese mines in Chiatura (International Federation of Chemical, Energy, Mine and General Workers' Unions, 2010).

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Mineral Fuels

Oil and Natural Gas.—Georgia issued an initial forecast that its oil resources totaled 2.350 billion metric tons (Gt), of which 1.2 Gt was onshore and 1.15 Gt was on the Black Sea shelf. The forecasted resource of natural gas amounted to 180 billion cubic meters (Interfax Russia & CIS Oil and Gas Weekly, 2009).

Marine Resources Exploration International B.V. (Marexin), which was registered in the Netherlands, was declared the winner of the tender on the general license to explore for and exploit oil and gas resources in the deepwater Block II-D on Georgia's Black Sea shelf. Marexin was the winner of one of two lots and was to receive rights to operate at water depths of up to 100 meters (m). Turkiye Petrolleri Anonim Ortakligi (TPAO) bid for the second lot, which covers operations at water depths of more than 100 m. Negotiations with the TPAO were being conducted. Exploration of Georgia's shelf was also being conducted by the Anadarko Petroleum Corp. of the United States, which had received a 25-year license in 2000 to develop Blocks II-A, II-B and III, which covered a total of 900 square kilometers (Interfax Russia & CIS Oil and Gas Weekly, 2009).

Outlook

Production in the mineral industry of Georgia was reviving and the country could increase its production of copper, gold, and manganese concentrates and ferroalloys, and natural gas and petroleum considerably. Georgia had been able to attract a limited number of foreign investors, and future prospects for mineral development would depend, to some degree, on the country being able to attract additional foreign investment.

Exploration on Georgia's Black Sea shelf could establish the presence of additional exploitable mineral fuel and nonfuel mineral resources. Georgia's issuance of a license to Marexin to mine nonfuel minerals on the Black Sea shelf could result in additional production of metals and construction materials. Marexin, which was engaged in offshore oil and gas exploration, won an auction held on December 4, 2009, for rights to extract subsurface resources from Georgia's Black Sea shelf. Marexin was the only bidder and offered to pay $2.2 million for the license. It won the right to extract subsurface resources (except oil and gas), which included iron ore and nonferrous ores, construction materials and other nonmetallic ores for a period of 25 to 30 years. Production could be conducted in water up to 100 m deep. Under the terms of the license, Marexin would have to begin production in 8 years. The state would share in production at the following rates: 30% in the first 6 years of production, 50% in the next 5 years, and 60% for the rest of the license period. Marexin was obligated to organize primary processing of nonfuel minerals in Georgia (Interfax Russia & CIS Metals and Mining Weekly, 2009).

References Cited

Caucaz Europenews, 2008, Georgia, Stemcor finalize USD 77 mln deal: Caucaz Europenews, January 8. (Accessed January 21, 2009, at http://www.caucaz.com/home_eng/depeches.php?idp=1467.)

GeoProMining Ltd., 2008, Corporate information: GeoProMining Ltd. (Accessed March 11, 2010, at http://www.geopromining.com/office-locations.html.)

Georgian International Media Centre, 2009, Thames Steel—Georgian Steel: Georgian International Media Centre, December 8. (Accessed July 26, 2010, at http://georgiamediacentre.com/category/tags/thames_steel.)

Georgian Times, The, 2009, Thames Steel continues fighting: The Georgian Times. November 10. (Accessed July 27, 2010, at http://www.geotimes.ge/index.php?m=home&newsid=19137.)

Interfax Russia & CIS Metals and Mining Weekly, 2007, Industrial investors to set up copper concentrate plant in Georgia: Interfax Russia & CIS Metals and Mining Weekly, issue 6, February 9-15, p. 17.

Interfax Russia & CIS Metals and Mining Weekly, 2009, Marexin wins license to subsurface resources on Georgian Black Sea shelf: Interfax Russia & CIS Metals and Mining Weekly, issue 48, December 4-10, p. 23, 24.

Interfax Russia & CIS Metals and Mining Weekly, 2010, Eurasia steel commissions steel mill in Georgia: Interfax Russia & CIS Metals and Mining Weekly, issue 4, January 29-February 4, p. 20.

Interfax Russia & CIS Oil and Gas Weekly, 2009, Marexin wins oil and gas license on Georgia's shelf: Interfax Russia & CIS Oil and Gas Weekly, issue 37, September 17-23, p. 31.

Interfax Russia & CIS Statistics Weekly, 2010a, Summary socio-economic survey of CIS & Baltic countries: Interfax Russia & CIS Statistics Weekly, issue 1-2, January 1-15, p. 5-7.

Interfax Russia & CIS Statistics Weekly, 2010b, Summary socio-economic survey of CIS & Baltic countries: Interfax Russia & CIS Statistics Weekly, issue 14, April 3-9, p. 3-4.

International Federation of Chemical, Energy, Mine and General Workers' Unions, 2010, Miners, metalworkers not intimidated by Georgian manganese managers: International Federation of Chemical, Energy, Mine and General Workers' Unions, May 3. (Accessed July 22, 2010, at http://www.icem.org/en/78-ICEM-InBrief/3731-Miners-Metalworkers-Not-Intimidated-by-Georgian-Manganese-Managers.)

JSC Madneuli, 2010a, Copper: JSC Madneuli. (Accessed July 22, 2010, at http://www.madneuli.ge/index.php?section=20.)

JSC Madneuli, 2010b, Location: JSC Madneuli. (Accessed July 22, 2010, at http://www.madneuli.ge/index.php?section=1.)

JSC Madneuli, 2010c, Reserves and resources: JSC Madneuli. (Accessed July 22, 2010, at http://www.madneuli.ge/index.php?section=18.)

JSC Madneuli, 2010d, Welcome: JSC Madneuli. (Accessed July 22, 2010, at http://www.madneuli.ge/index.php?section=39.)

Lomtadze, Levan, 2008, Russian owned Madneuli plans new investments in Georgia: The Financial—Georgia, January 1, 3 p. (Accessed July 22, 2010, at http://www.gab-ibn.com/IMG/pdf/Ge2-_Russian_Owned_Madneuli_Plans_New_Investments_In_Georgia.pdf.)

Ministry of Economic Development of Georgia, 2007, News: Ministry of Economic Development of Georgia. (Accessed January 21, 2009, at http://www.privatization.ge/spp/spp/news_view.php?lang=en&action=article&news_id=40.)

Shields, Samantha, 2010, Constructing steel in Georgia: Business New Europe, April 17. (Accessed July 26, 2010, at http://georgiandaily.com/index.php?option=com_content&task=view&id=18218&Itemid=73.)

World Investment News, 2008, Madneuli—"Mineral wealth for the future of Georgia": World Investment News. (Accessed January 21, 2009, at http://www.winne.com/europe/georgia/reports/2006/cp/madleuni/index.php.)

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TABLE I

GEORGIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]	2005	2006	2007[e]	2008[e]	2009[e]
METALS					
Copper, mine output, Cu content of concentrate[e]	10,000	9,000	11,000	11,000	9,000
Gold[e] kilograms	1,620	1,600	2,000	2,000	2,000
Iron and steel:					
Ferroalloys, electric furnace:					
Ferromanganese	13,945	5,130	5,000	5,000	4,500
Silicomanganese	109,414	116,945	120,000	120,000	105,000
Total	123,359	122,075	125,000	125,000	110,000
Steel, rebar[e]	NA	NA	NA	NA	70,000
Lead, mine output, Pb content[e]	400	400	400	400	300
Manganese ore, marketable:					
Gross weight	251,800	328,643	350,000 [3]	400,000	350,000
Mn content[e]	73,000	95,300	102,000	116,000	102,000
Silver[e] kilograms	1,000	1,000	1,200	1,360	1,200
Zinc, mine output, Zn content of concentrate[e]	400	400	400	400	300
INDUSTRIAL MINERALS					
Cement[e]	450,000	450,000	450,000	450,000	400,000
Clays, bentonite	7,876	4,487	5,000	5,000	4,000
Gypsum	238	123	125 [3]	125	100
Nitrogen, N content of ammonia[e]	130,000	140,000	150,000	150,000	125,000
Perlite[e]	45,000	45,000	45,000	45,000	40,000
Salt[e]	30,000	30,000	30,000	30,000	30,000
MINERAL FUELS AND RELATED MATERIALS					
Coal, bituminous	5,100	8,284	8,280	NA	NA
Natural gas thousand cubic meters	14,800	21,400	21,400	NA	NA
Petroleum:					
Crude	66,600	63,506	63,500	NA	NA
Refined	40,000	40,000 [e]	40,000	40,000	35,000

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. NA Not available.

[1]Table includes data available through July 27, 2010.

[2]In addition to the commodities listed, Georgia had also produced barite and zeolites, but available information was inadequate to make reliable estimates of output.

[3]Reported figure.

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TABLE 2

GEORGIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

(Metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners[2]	Location or deposit names[2]	Annual capacity[e]
Arsenic:				2,000 [3]
As content of ore		Racha mining and chemical plant	Lukhumi deposit, Ambrolauri region	
Do.		Tsana mining and chemical plant	Tsana deposit, Lentekhi region	NA
Metal and compounds		Racha mining and chemical plant	Racha region	NA
Do.		Tsana mining and chemical plant	Ts'ana region	NA
Barite		NA	Chordskoye deposit, Onis Raioni	70,000
Do.		JSC Madneuli complex (GeoProMining Ltd., 97%)	Madneuli deposit	NA
Barite-zinc ore		NA	Kvaisi deposit	NA
Bentonite		Askana LLC (Silver & Baryte Ores Mining Co., 97.7%)	Askanskoye deposit, Ozurget'i	200,000 [3]
Do.		NA	Gumbrskoye deposit, Gumbra region	NA
Cement		LLC Kartuli Cementi (LLC HeidelbergCement Caucaus Shared Services, 70%)	Kaspi and Rust'avi	1,100,000
Do.		LLC SaqCementi (LLC HeidelbergCement Caucaus Shared Services, 75%)	Rust'avi	500,000
Coal		JSC Tkibulnakhshiri	Akhaltsikhe, Tkibuli-Shaorskoye, and Tkvarchelskoye deposits in Akhalts'ikhis Raioni, Tqibuli, and Tqvarch'eli regions	300,000 [3]
Copper, Cu content of ore		JSC Madneuli complex (GeoProMining Ltd., 97%)	Bolnisi region	12,000
Copper-gold ore		Trans-Georgian Resources (GeoProMining Ltd., 50%)	Sakdrisi deposit	NA
Diatomite		NA	Kisatibskoye deposit, K'isat'ibi region	150,000
Ferroalloys:				
Ferromanganese		Georgian Manganese Holding Limited LLC (Stemcor Holdings Ltd.)	Zestafoni ferroalloys plant, Zestap'onis Raioni	100,000
Silicomanganese		do.	do.	250,000
Manganese sinter		do.	do.	250,000
Gold, mill		Quartzite Ltd. (GeoProMining Ltd.)	Madneuli deposit	2
Iron and steel, steel, rebar		Eurasia Steel	K'ut'aisi	100,000
Do.		GeoSteel LLC (JSW Steel Ltd., 49%, and Georgian Steel Holding Group, 51%)	Rust'avi	125,000
Iron ore		NA	Hrazdan deposit	NA
Do.		NA	Tkibuli-Shaorskoye deposit, Tqibuli region	NA
Lead-zinc:				
Pb content of ore		NA	Kvaisi deposit	1,200
Zn content of ore		NA	do.	3,000
Manganese, marketable ore		Chiaturamanganumi enterprise of Georgian Manganese Holding Limited LLC (Stemcor Holdings Ltd.)	Chiatura deposit	500,000
Nitrogen		JSC Azoti chemical plant	Rust'avi	NA
Petroleum:		Saknavtobi and most Georgian petroleum companies in joint ventures with Frontera Resources, Ioris Valley, GBOC-Ninotsminda, Anadarko, and GeoGeroil	About 60 wells that account for 98% of output in Mirzaani, Sup'sa, and Zemo T'elet'i regions	200,000 [3]
Crude				
Refined	42-gallon barrels per day	LLC Terminal	Batumi refinery, Ajaria	NA
Do.	do.	NA	Georgian American Oil Co. Refinery (GAOR), Sart'ichala	4,000 [4]

See footnotes at end of table.

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TABLE 2—Continued

GEORGIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

[e]Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

[1]Table includes data available through July 28, 2010.

[2]Many location names have changed since the breakup of the Soviet Union. Many enterprises, however, are still named or commonly referred to based on the former location name, which accounts for discrepancies in the names of enterprises and that of locations.

[3]Capacity estimate is the total for all enterprises that could produce this commodity.

[4]Closed.

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The Mineral Industry of Germany

By Steven T. Anderson

In 2009, Germany was a leading global exporter of industrial goods and services (including processed and fabricated mineral products). The country's mineral industry, however, depended heavily on imported mineral raw materials. Germany was the leading producer of lignite in the world, and essentially all of the lignite consumed in the country was supplied by domestic production. Combustion of lignite accounted for 11.3% of total primary energy consumption in the country. Germany was dependent on imports of other mineral fuels for most of the remainder of its primary energy consumption, and combustion of petroleum and petroleum refinery products accounted for 34.7% of total primary energy consumption in Germany; that of natural gas, 21.8%; and that of bituminous and anthracite (hard) coal, 11.1%. Nuclear energy accounted for 11% of total primary energy consumption; renewable energy resources, such as wind power, accounted for 8.9%. Germany's metal processing sector relied on imports of metal ores and concentrates and reprocessing of metallic scrap and waste materials (both imported and produced domestically), because no metals were mined in sufficient concentrations for domestic metallurgical use in the country. Germany is also heavily reliant on imports for the country's use of numerous industrial minerals and many refined metals (Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 21-24; 39, 49-50, 55, 189; Bundesministerium für Wirtschaft und Technologie, 2010b, p. 6-15; Casteel, 2010, p. 2).

In 2008 (the latest year for which information was available), Germany accounted for about 18% of total production of lignite in the world. In 2009, the country was the third ranked producer of kaolin (and was estimated to have accounted for about 14% of global production), salt (7.2%), and refined lead (4.4%); Germany was the sixth ranked producer of potash (8.2%); and it was the seventh ranked producer of refined copper and crude steel (3.7% and 2.7%, respectively). Additionally in 2009, Germany either produced or was estimated to have produced greater than 1% of the world's output of barite, bentonite, cadmium (secondary), cement, feldspar, gallium, gypsum, indium, crude iron, lime, magnesium compounds (as byproducts of potash mining), nitrogen (ammonia), industrial quartz, silica (industrial sand and gravel), sulfur, and zinc metal. Germany's domestic mineral processing sector was estimated to have accounted for at least 5% of the world's total production capacity of alumina, fused aluminum oxide (abrasive), graphite, magnesium metal (secondary), rhenium metal (byproduct), strontium compounds, and titanium dioxide pigments (table 1; Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, p. 172; 2010, p. 35, 59, 65, 67-68, 75, 147, 155, 158, 161, 164, 170; Kostick, 2010; Virta, 2010).

The international competitiveness of the country's nonfuel mineral processing and fabrication sectors relied primarily on such factors as a highly skilled labor force, research, development and rapid assimilation of new technologies (including metal and other mineral materials recycling technologies), and the development and maintenance of liberal trade relationships both within and outside the European Union (EU). The prices of many mineral commodities that were requisite inputs into Germany's mineral processing sector and (or) important mineral materials output by the mineral industry of the country decreased substantially from March through December 2008, including a 69% decrease in the price of nickel, 68% decrease in the price of lead, 63% decrease in the price of copper, 61% decrease in the price of crude petroleum, 56% decrease in the price of zinc, 50% decrease in the price of aluminum, and 43% decrease in the price of tin. In 2009, stimulus packages and other governmental policies in the G-20 countries appeared to help encourage increased global demand for mineral commodities and orders for industrial products (including for those produced in Germany). From January to August 2009, the price of copper increased by 126%; nickel, 89%; lead, 85%; tin, 83%; crude petroleum, 78%; zinc, 72%; and aluminum, 50%; and prices were expected to remain at higher (compared with yearend 2008) levels through the end of 2009 and into 2010 mostly owing to an expected continuation of strong demand for minerals and mineral-based products in China and somewhat to expected increases in demand in Brazil, India, and Russia (Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 18-28; Bundesministerium für Wirtschaft und Technologie, 2010b, p. 6-15).

Germany's relative position in the global mineral economy is predominantly as a major consumer and processor of minerals, and this role continues to evolve as emerging economies grow and competition for the use of minerals increases. In 2009, China was the world's leading consumer of crude steel (accounting for 53% of global consumption), hard coal (51%), tin (about 45%), lead (slightly greater than 44%), zinc (slightly less than 44%), aluminum (about 41%), copper (39%), and nickel (36%). The United States was the second ranked consumer of all of these same mineral commodities except for nickel, for which Japan was ranked second and the United States was ranked third. The United States was the leading consumer of crude petroleum in the world; China was ranked second; and Japan, third. Germany was the world's third ranked consumer of copper, the fourth ranked consumer of lead and nickel, and the fifth ranked consumer of aluminum and tin; it was not one of the world's top five consumers of hard coal, crude petroleum, crude steel, or zinc. Also, China replaced Germany as the leading exporter in the world (in terms of the total value of exports of all goods and services) (Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 18-21; Bundesministerium für Wirtschaft und Technologie, 2010b, p. 6-15; McDonald, 2010).

The planned nonferrous metals exploration budgets (excluding planned expenditures to fund exploration for bauxite, but including that for uranium) of 1,846 companies worldwide decreased to a total of $7.32 billion compared with $12.6 billion in 2008, and this increased the uncertainty of Germany being able to secure adequate supplies of the nonferrous metallic mineral raw materials required by the

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country's metal-processing sector in the future. Even as many mineral commodity prices appeared to be recovering from the downturn during the latter half of 2008, credit availability (including for junior mineral exploration companies) had not, and some analysts expected a lingering effect on supplies of imported mineral raw materials for use in Germany's industrial sector owing to lag times for new mineral supplies to become available, even if global exploration and development expenditures were to increase substantially in 2010 (Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 18-21; Bundesministerium für Wirtschaft und Technologie, 2010b, p. 6-15; Goulden, 2010).

Minerals in the National Economy

In 2009, the total value of Germany's industrial output (including the value of output by the country's mineral industry, but not that of the construction sector) accounted for about 22% of the gross domestic product (GDP), which was reportedly the highest share of a nation's GDP accounted for by this economic sector among leading developed economies. In 2008 [the latest year for which detailed information was available from the Federal Statistical Office of Germany (DESTATiS)], the total value of output by the country's metals processing sector (up to the foundry stage) accounted for about 4.7% ($171 billion[1]) of the GDP, and the minerals extraction sector [mining (including coal mining), quarrying, and the extraction of crude petroleum and natural gas] reportedly accounted for 0.5% ($19 billion) of the GDP. According to Germany's Federal Institute for Geosciences and Natural Resources (BGR), the value of the country's total production of mineral raw materials and fuels was about $24 billion in 2009, which would account for about 0.7% of the GDP, but this BGR figure appears to include the value of production of some mineral products that are not included in the DESTATiS series (Schäfer, 2009; Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 21, 28, 35-39, 83; Statistisches Bundesamt, 2010c, p. 376, 629, 637).

One of Germany's (international) competitive advantages in continuing to harbor a vibrant industrial sector appears to be the country's ability to maintain a highly skilled industrial workforce. At least partially owing to Government labor subsidies, industrial company workforce flexibility measures, and a structure for labor contracts that typically makes it difficult and expensive for companies in Germany to fire permanent employees, the number of employees in the country's industrial sector decreased by only about 4.45% to 5,734,000 compared with about 6,001,000 employees in 2008, although the value of production of the sector was estimated to have decreased by about 21% to about $660 billion compared with about $840 billion during the same timeframe. The apparently small decrease in employment in the industrial sector could be viewed as even more surprising if one considers that the 2008 level of employment in the sector in Germany was the highest since 2004. In 2009, the total number of employees in the metals processing sector decreased to about 250,000 compared with 270,000 in 2008 (or by about 6.7%), and that in the mineral extraction sector decreased to about 74,000 compared with about 77,000 (or by 3.9%) during the same timeframe. Compatible data on the change in the value of production of the mineral extraction sector between 2008 and 2009 were not available, but data on the marketed production of the metals processing sector indicate that this value decreased to $85 billion compared with $141 billion (or by 40%) during this timeframe (Statistisches Bundesamt, 2006, p. 359; 2009, p. 15; 2010a, p. 11; 2010c, p. 369, 381, 641-642; Schäfer, 2009, 2010; Bundesministerium für Wirtschaft und Technologie, 2010b, p. 6-15).

According to the BGR, the 12 most valuable mineral raw materials produced in Germany in 2009 were (in decreasing order of value of production) lignite ($9.0 billion); natural gas (about $4.4 billion); construction sand and gravel ($2.0 billion); crushed stone, including chalk ($1.8 billion); hard coal ($1.5 billion); crude petroleum (about $1.3 billion); potash ($1.1 billion); rock salt and industrial brines, NaCl content ($936 million); dolomite, limestone and marble (about $602 million); kaolin ($586 million); ceramic and refractory clays (about $481 million); and silica sand ($231 million). Domestic production of mineral fuels appeared to have some economic benefit in addition to the simple value of output in that it helped somewhat mitigate uncertainty in the domestic provision of electricity and distribution of imported mineral fuels. For example, domestic production of natural gas and other mineral fuels could conceivably help substitute for imports of natural gas if, for instance, there is an unexpected reduction in supplies of imported natural gas (as took place with supplies of natural gas that passed through Ukraine on their way to Germany in both 2006 and 2008) (Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 37-39; Gesamtverbands Steinkohle e.V., 2010, p. 40-50; Global Intelligence Report, The, 2010).

According to DESTATiS, the country's estimated mineral trade balance in 2009 for all sectors of the mineral industry (including trade in intermediate mineral products, such as cement) was –$93 billion, compared with –$154 billion in 2008 and –$108 billion in 2007. In 2009, Germany's mineral trade deficit decreased compared with that of 2008 because the decrease in the total value of the country's mineral imports (to $141 billion from $230 billion) was of greater magnitude than the decrease in the total value of its mineral exports (to $48 billion from $76 billion) during this timeframe. As an example, the value of petroleum refinery products exports, which was the leading mineral export category, decreased to $13 billion in 2009 from $24 billion in 2008, but the combined value of the country's imports of crude petroleum and natural gas (which was the leading mineral import category, by value) decreased to about $77 billion compared with $122 billion during this same timeframe. According to the BGR, the value of Germany's imports of minerals fuels and related materials in 2009 decreased to $84 billion from about $132 billion in 2008; that of metallic raw materials, to $31 billion from about $53 billion; and that of industrial minerals, to $2.2 billion from about $2.9 billion (Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 39-40; International Monetary Fund, 2010; Statistisches Bundesamt, 2010b, p. 71-75).

[1]Where necessary, values have been converted from European Union euros (€) to U.S. dollars (US$) at an annual average exchange rate of €0.7964=US$1.00 for 2006, €0.7296=US$1.00 for 2007, €0.6795=US$1.00 for 2008, and €0.718=US$1.00 for 2009. All values are nominal, at current prices, unless otherwise stated.

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Reliable information concerning the separate contribution of Germany's secondary mineral materials production to the GDP in 2009 was not available. In addition to any contribution to the GDP, Germany's recovery of secondary mineral materials and use in the mineral industry is important to the economy because it reduces the country's reliance on imports of primary mineral raw materials, helps the mineral industry consume less energy (on average), helps lower emissions of greenhouse gases relative to primary mineral industry production, and promotes a more sustainable supply of mineral raw materials in the future. In 2009, Germany faced the common challenges concerning the availability of scrap and volatility in the prices of secondary materials. Prices of secondary mineral materials often fluctuate in correlation with the prices of primary materials (for which they can be substituted). International availability of secondary materials can often be restricted. For example, important German trading partners that had recently raised duties on the export of scrap metals included China, India, Russia, and Ukraine, among others (Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 42-45).

Germany continued to invest in advanced technologies for recycling and in developing advanced technologies to recycle waste electrical and electronic equipment (WEEE) to obtain such precious metals as gold, platinum-group metals (PGMs), and silver, and such other metals as aluminum, copper, ferrous metals, indium, lead, nickel, tantalum, and zinc, while taking care to safely reuse or dispose of potentially harmful elements in recycled electronic products, such as arsenic, cesium, and (or) mercury. A particular challenge for being able to profitably recycle electronic products is that the valuable elements are often present only in very small amounts and (or) are often included in these products in a manner that makes it very complex to extract them. Even when the technology appears to be advanced enough to profitably recycle end products to obtain secondary mineral materials, there is a common problem with availability owing to fairly long useful lives of those products. For example, Germany's copper institute has estimated that the average life of a product that contains a profitable amount of recyclable copper is about 33 years. Also, Germany may have some particular economic disadvantages in using more secondary mineral materials relative to some other countries. For example, electronic steel furnaces can produce crude steel using 100% recycled material whereas oxygen blown converters can use a maximum of 25% secondary raw material; however, only 32% of Germany's crude steel production capacity is accounted for by production from electric arc furnaces whereas electric arc furnaces account for 80% of the crude steel production capacity in Turkey (for instance). An economic reason for this could be that electricity is comparatively more expensive in Germany than in other countries (such as Turkey, perhaps), and the result is that Germany possibly uses proportionally less steel scrap than some other countries. Despite such challenges, the proportion of refined copper produced in Germany from secondary materials was estimated to have been about 3.7 times greater than the global average, that of aluminum was about 1.7 times greater, that of lead was 1.2 times greater, and that of crude steel was 1.1 times greater (Scheben, 2009; Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 43-45).

Germany was also involved in the recycling of industrial minerals, but that activity mostly involved the reuse or recycling of the end products, such as glass or various building materials. During the process of using industrial minerals to produce products for end use, industrial minerals are typically transformed to an extent that prohibits economically recovering the mineral raw materials (such as trying to recover clay from bricks, feldspar from glass, or limestone from cement). From 1970 to 2009, however, an estimated 40 million metric tons (Mt) of silica sand and many millions of metric tons of such minerals as feldspar and soda ash have been saved (for future use) in Germany through the country's glass-recycling program (Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 45-46).

Government Policies and Programs

Germany's main mining law is the Federal Mining Act (BGBl. IS. 1310), which was approved on August 13, 1980, and revised on December 9, 2006, through slight revision to provisions of Article 11 (BGBl. IS. 2833). The country's production of some minerals (including gypsum and anhydrite, limestone and some other types of natural stone, peat, and some types of sand and gravel) was not directly regulated under the Federal Mining Act, but was covered by a variety of other land-management and environmental regulations at both the Federal and State levels. Also, the setup of the Federal Mines Inspectorate was not determined in the Federal Mining Act (although this inspectorate does enforce many of the regulations in the main mining law); the Federal Mines Inspectorate was established through Articles 83 and 84 of Germany's constitutional law. During 2009, the Government program to phase out the subsidy for the mining of hard coal was ongoing and continued to adhere to a schedule to completely eliminate the subsidy by 2018. In 2009, the total amount of this subsidy decreased to about 2.2 billion euros (about $3.1 billion) compared with 2.4 billion euros ($3.5 billion) in 2008 and 2.5 billion euros ($3.4 billion) in 2007, and the subsidy was still scheduled to be further reduced to 2 billion euros in 2010 and to 1.8 billion euros in 2012 (Bundesministerium der Justiz, 2007, p. 1; Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 37-38, 53-54; Bundesministerium für Wirtschaft und Technologie, 2010a, p. 11, 36-49; Casteel, 2010, p. 4; Gesamtverbands Steinkohle e.V., 2010, p. 12).

A Government program that appeared to be important in maintaining Germany's (1) industrial and manufacturing production capacity during the economic downturn that lasted through almost all of 2009, (2) capacity to continue to process minerals and produce high-value-added mineral-based products, and (3) workforce's expertise to do so was a policy to subsidize part-time work ("Kurzarbeit"). The country's Kurzarbeit subsidy is a policy that allows the Government to directly pay up to two-thirds of the wages that would otherwise be lost by an employee if his or her employer decides to cut that worker's hours below the full-time level. This policy appears to be based on legislation that was passed in 1910 to aid Germany's potash producers. In 2009, the Government increased the maximum time for selected workers to receive the Kurzarbeit subsidy to 24 months and allowed companies still to hire and train

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workers while the workers received this subsidy. In 2009, instead of firing highly trained workers and losing much of the expertise of existing employees and that of younger potential employees who might shun the sector (while still in school) in favor of another career path that might appear to have greater job security, many industrial companies (including in many sectors of the mineral industry) appeared to be able to invest in machinery and materials (often at far lower prices than in 2007 or 2008), in research and development to improve their processes and products, and in training or retraining workers to possibly be able to produce at an even higher rates of efficiency than before the economic downturn. In 2009, Government expenditures on its Kurzarbeit program were estimated to be about $8.4 billion (Braithwaite, Benoit, and Atkins, 2009; Bryant, 2009; Schäfer, 2009; Bundesministerium für Wirtschaft und Technologie, 2010b, p. 6-15; 2010c, p. 20).

In January 2009, the Government began a program of issuing certificates worth about $3,500 to buyers of new cars who simultaneously traded in a car that was at least 9 years old. This program ended in September, and the Government was estimated to have spent about $7 billion on it. About 2 million German consumers were estimated to have scrapped at least one old automobile to receive this bonus, which could have substantially increased the availability of recycled metallic materials in the country during the year, including aluminum, lead (from the old car batteries), PGMs (from the old catalytic converters), and other metals. Even with this program continuing for many months in 2009, sales of new automobiles in Germany appeared to have decreased by between 13% and 14% compared with that of 2008, and it did not appear as though enough manufacturing of new automobiles took place to provide sufficient increases in domestic demand to result in net increases in production of metals in the country. In 2009, about 30% of Germany's production of processed nonferrous metals (not including precious metals, such as PGMs or silver) was used in the automobile industry (transportation sector), on average, although the proportions varied substantially from 73% of lead or 44% of aluminum, to 6% of copper or an insignificant amount (1% or less) of zinc (table 1; Bryant, 2009; El-Sharif, 2009, Kirschbaum, 2009; Atkins, 2010; Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 41-45; WirtschaftsVereinigung Metalle e.V., 2010, p. 82-83; 102-103).

In 2007, the Government together with industry leaders developed the components of a new raw materials strategy, and the Chancellor established an Interministerial Committee on Raw Materials to identify problems with the supply of raw materials (including minerals) for German industries and to produce solutions. In 2009, an interim report on the work of this committee was presented to Parliament, and submission of a final version of this strategy to the Government for possible adoption as a Federal policy was expected to happen sometime in 2010. In short form, the main objectives of the new raw materials strategy appeared to be—

- Reduce trade barriers and distortions of competition
- Help German industry diversify its sources of raw materials
- Help industry develop synergies from sustainable economic activity and enhanced materials efficiency
- Develop technologies and instruments to improve the conditions for recycling
- Establish bilateral raw materials partnerships with selected countries
- Do research into substitution and materials in order to open up fresh options
- Focus research programs relating to raw materials
- Create transparency and good governance in raw materials extraction
- Integrate national measures with European policy on raw materials

On November 4, 2008, the European Commission (EC) adopted a new raw materials initiative that includes measures to secure and improve access to raw materials (including minerals) for the EU. The EC expected to report on its progress in implementing this EU initiative sometime in 2011. This EU initiative could be viewed as supplemental to Germany's new raw materials strategy, because it appeared as if it will be more focused on international trade and development issues than on specific industrial objectives within any specific country (Commission of the European Communities, 2008; Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 46-49; Bundesministerium für Wirtschaft und Technologie, 2010b, p. 6-15, 26-27; 2010c, p. 6-7, 25).

The Environmental Impact Assessment Act (EIA Act) (BGBl. IS. 1757, 2797), which was approved on June 25, 2005, and revised through slight changes to Article 2 (BGBl. IS. 3316) of the Act on December 21, 2006, was the environmental law that was most applicable to the mineral industry during 2009. This Act incorporates provisions of an older ordinance concerning the assessment of environmental impacts for mining projects (BGBl. IS. 1420), which was approved on July 13, 1990, and revised through slight changes to Article 8 (BGBl. IS. 2819) on December 9, 2006; the Act also incorporated other older ordinances, such as one for the protection of groundwater against pollution caused by certain dangerous substances (BGBl. IS. 542), which was approved on March 18, 1997, and was still applicable to the use and disposal of many of the chemicals used in mining and mineral processing in Germany. The EIA Act requires environmental impact assessments for all domestic waste repositories created or used by the mineral industry. The Federal Mining Act actually stipulates how these repositories are to be constructed and operated (monitored) (Bundesministerium der Justiz, 2007, p. 30; Bundesministerium für Wirtschaft und Technologie, 2010a, p. 36-38, 48-50).

On June 25, 2009, Directive 2009/29/EC of the European Parliament and of the Council (of April 23, 2009) entered into force to amend Directive 2003/87/EC (which established the greenhouse gas emission allowance trading scheme [ETS] for the EU), with the main goals of improving the ETS and extending it beyond 2012. In 2009, Trimet Aluminium AG (Germany's leading producer of primary aluminum) claimed that the ETS was leading to increases in electricity rates in Germany that were far greater than in neighboring countries, because Germany's Government was not controlling electricity rates to as great an extent as in some other aluminum-producing countries. (The process to produce primary aluminum is very

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electricity-intensive.) Under Directive 2003/87/EC, electrical companies in the EU were able to pass along the cost of purchasing greenhouse gas emission allowances (carbon permits) to electricity consumers unless this practice was regulated against at the country or State level, and it did not appear that any of the amendments in Directive 2009/29/EC would establish greater regulation of this practice at the EU level. Although most of these carbon permits were issued for free (and could continue to be through 2012), at least some companies reportedly sold off carbon permits to acquire cash during the economic downturn (possibly because demand for their products decreased, leading to the companies decreasing production and emitting less CO_2, and therefore requiring fewer carbon permits). When demand for their products increases, however, companies (including power generating companies and many companies within the mineral industry) that need to emit CO_2 to produce could need to buy back carbon permits, which could drive up the price of the permits. During 2009 and 2010, Trimet expected to spend about $45 million per year for the costs of the carbon permits embedded in its electricity bills; the company expected that its annual expenditure (indirectly) on CO_2 emissions by electricity generators would reach about $115 million in 2011 and 2012 and an estimated $150 million in 2013 and beyond. In June 2009, the German Government agreed in principle to grant about $56 million to domestic producers of nonferrous metals to help compensate them for part of their estimated CO_2 costs related to these companies' consumption of electricity, but this proposed grant was being investigated by the EC as possibly not being compatible with EU single market rules concerning individual member state aid. Information concerning the ruling of the EC on this matter or whether the German Government was able to help mitigate these indirect CO_2 costs for nonferrous metals producers (with this policy or in some other way) was not available at the time of this writing (European Parliament and Council, 2009, p. 63-68, 71-74; Harvey, 2009; Scheben, 2009; Trimet Aluminium AG, 2009, p. 2; Commission of the European Communities, 2010; Gesamtverbands Steinkohle e.V., 2010, p. 30-36; Kanter, 2010; Szabo, 2010).

Production

Data on mineral production are in table 1. In 2009, production of almost all minerals and mineral-based products in Germany decreased compared with that of 2008 owing to decreases in demand for German production of these mineral commodities. Among the metals, the apparent use of aluminum in the country decreased by about 31% compared with that of 2008, crude steel (30%), zinc metal (about 29%), refined lead (greater than 19%), and refined copper (19%). Given this information on decreases in Germany's use of metals in 2009, the country's total production of refined copper was notable for having decreased by only 3% compared with that of 2008. The country's production of copper may not have decreased as much as that of other metals because demand for copper from Germany's trading partners may not have decreased as much as for other metals. Global use of refined copper appeared actually to increase by about 9% compared with that of 2008, which was a greater proportional increase than for the other major metals that Germany produced, such as refined lead (the global use of which increased by about 2.5%), aluminum (which decreased by approximately 5%), refined zinc (which decreased by 6%), and finished steel products (which decreased by 7%) (table 1; Gesamtverband der Aluminiumindustrie e.V., 2009; Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 148, 153, 156, 159, 162, 165; WirtschaftsVereinigung Metalle e.V., 2010, p. 88-89, 92-93).

Germany's secondary production of most of these same metals did not decrease as much as primary production, except that secondary production of zinc metal was estimated to have decreased by about 77% (compared with a decrease of about 37% in the production of primary zinc metal). Production of both primary and secondary zinc metal decreased owing to the closure of Ruhr-Zink GmbH at the end of 2008, and production of secondary zinc may have decreased even more than secondary production of aluminum (which decreased by 22%), refined copper (which decreased by 2.7%), and refined lead (which decreased by 5.4%) because of a lower availability of scrap zinc compared with the availability of scrap containing these other metals, including as a result of the Government's program to subsidize scrapping of automobiles in 2009. Also, the greater decrease in the production of secondary zinc could be related to a greater correlation with the decrease in the production of steel in Germany than that of aluminum, copper, or lead, because some secondary zinc in the country is produced from waste electric steel mill dust. Germany's production of crude steel decreased by about 29% (table 1; GEA Group AG, 2009, p. 118; Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 65-71, 148, 153; Recylex S.A., 2010, p. 1-3; WirtschaftsVereinigung Metalle e.V., 2010, p. 88-89, 92-93).

Production of almost all industrial minerals in Germany decreased substantially in 2009 compared with that of 2008. Production of kaolin increased by about 25%, however, almost entirely owing to an increase of about 45% in production at mines in Bavaria (by far the leading kaolin-producing State in the country) during this timeframe. Production of rock salt and some brines increased by about 43% mostly in response to an increase in European demand for deicing salt products during the more severe and longer-lasting (than average) winter weather conditions during the first quarter and last two weeks of 2009 compared with that during the same periods in 2008. Production of minerals and mineral products primarily for the construction sector also decreased, mostly owing to continuing decreases in orders received for the domestic construction sector. Production of dimension stone increased by about 84% during this timeframe, however, although detailed information concerning the reason(s) for this increase was not available. The country's exports of granite, marble, travertine, and some other dimension stones increased significantly compared with that of 2008, and the leading export destination for these stones in 2009 was Switzerland. Thus, Germany's increased production of dimension stone could have been in response to a sudden increase in demand for some Swiss project(s) or increased demand in some other export market for German dimension stone (table 1; Bundesministerium für Wirtschaft und Technologie, 2009, p. 55; 2010a, p. 25-26, 54; Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 74-78, 137-138;

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K+S Aktiengesellschaft, 2010a, p. 7, 62; Statistisches Bundesamt, 2010c, p. 395).

The Lippe Mine was closed on January 1, 2009, and the Walsum Mine was closed in mid-2008, and production of anthracite and bituminous coal in Germany decreased by about 19% compared with that of 2008 almost entirely owing to these mine closures. The production of coke from anthracite and bituminous coal decreased by about 18% during this timeframe, which was consistent with the decrease in the production of hard coal. Production of neither crude petroleum, lignite, or natural gas decreased by greater than 10%, and production of lignite decreased by only 3%. Production of blast furnace gas was estimated to have decreased by the same proportion as production of pig (blast-furnace) iron. In 2009, the project to clean up and remove radioactive material in and around the uranium mine sites of the former Soviet-German mining company WISMUT SDAG in the States of Saxony and Thuringia did not result in any reported production of uranium, and this was also the case in 2008 (table 1; Bundesministerium für Wirtschaft und Technologie, 2010a, p. 11-19, 21-23; Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 49-58; Gesamtverbands Steinkohle e.V., 2010, p. 13; Landesamt für Bergbau, Energie und Geologie, 2010, p. 9, 29-38).

Structure of the Mineral Industry

Table 2 is a list of major mineral industry facilities. Since the closure of the last metal mines in 1992, there has been no mining of metallic minerals in Germany. Many of the leading companies in the global metals processing sector owned and operated significant facilities in Germany, however. ArcelorMittal (based in Luxembourg) was the leading producer of crude steel in the world and the second ranked producer in Germany. ThyssenKrupp AG (based in Duisburg) was the leading producer of crude steel in Germany and the 20th ranked producer of crude steel in the world. In 2009, Norddeutsche Affinerie AG (based in Hamburg) was renamed Aurubis AG and was the third ranked producer of marketable copper metal in the world and the leading producer of secondary refined copper. Aurubis was the leading producer of total refined copper in the EU. Salzgitter AG was the third ranked producer of crude steel in Germany and held a 20% ownership interest in Aurubis. Xstrata plc (based in Switzerland and registered in the United Kingdom) was the leading producer of zinc metal in Germany and claimed to be the leading integrated (mining to metal) producer of zinc in the world. Norsk Hydro ASA of Norway was the second ranked producer of aluminum in Germany and the fourth ranked producer in the world, and the company owned the largest single primary aluminum smelter in Germany (the Rheinwerk primary smelter at Neuss). On February 3, 2009, Briand Investments B.V. (a subsidiary of Klesch & Company Ltd. of the United Kingdom) acquired the smallest remaining primary aluminum smelter (at Voerde) in Germany from Corus Aluminium Voerde GmbH (a subsidiary of Tata Steel Ltd. of India), and renamed its new German subsidiary Aluminiumwerk Voerde Aluminium GmbH. The lead smelter of Berzelius Metall GmbH at Stolberg in Germany was one of the largest and most modern in the world, and it had a production capacity of about 150,000 metric tons per year (t/yr) of primary refined lead, which made Berzelius the leading producer of primary lead in the country (table 2; Aurubis AG, 2009, p. 10-14, 52-55; Klesch & Company Ltd., 2009; Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 58-59; 65-71; Norsk Hydro ASA, 2010, p. 27; Stahlinstitut VDEh and Wirtschaftsvereinigung Stahl, 2010, p. 18-21, 24-26, 34-36, 43-45; World Steel Association, 2010, p. 8; Xstrata plc, 2010, p. 11, 19, 85-89).

S.C.R.-Sibelco NV of Belgium was the leading producer of olivine, plastic (ball) clays, quartz, and silica (industrial) sand in the world, and Sibelco Deutschland GmbH (a German subsidiary of S.C.R.-Sibelco) was Germany's leading producer of mineral raw materials for use in the production of ceramics. Other than this subsidiary of a multinational company, family-owned small and medium-scale enterprises (SMEs) accounted for most of the remainder of the country's production of ceramic, kaolinitic, and plastic (ball) clays in the country. S&B Industrial Minerals S.A. of Greece was the leading producer of bentonite in the EU and the second ranked producer of bentonite in the world. Süd-Chemie AG was the leading supplier of bentonite-based adsorbents and additives in the world, and the company was the other major producer of bentonite in Germany (besides S&B). HeidelbergCement AG was the leading producer of cement in the country and the third ranked producer in the world. HeidelbergCement was also the world's leading producer of aggregates. K+S Aktiengesellschaft (K+S AG) was the leading producer of potash and salt (NaCl) in the EU, and the company was the leading producer of salt and the fourth ranked producer of potash in the world (table 2; Arbeitsgemeinschaft Westerwald-Ton e.V., 2009; HeidelbergCement AG, 2009, p. 3; 2010, p. 7, 66; Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 74-78; K+S Aktiengesellschaft, 2010a, p. 5, 12, 26; S&B Industrial Minerals S.A., 2010, p. 26; Süd-Chemie AG, 2010, p. 61; Sibelco Deutschland GmbH, undated).

In 2009, RWE Power AG accounted for about 54% of the total production of lignite in Germany, and about 89% of the company's lignite production was used to generate electricity domestically. RWE was the leading producer of electricity in Germany, the second ranked producer in the Netherlands, and the third ranked producer in the United Kingdom. About 90% of all the lignite produced in Germany was used domestically to produce electricity. In 2009, 77% of the salable production of hard coal in the country was used to produce electricity, 20% was used to produce steel, and about 3% was used to produce thermal energy. Reliable information concerning the individual production capacities of the six remaining hard coal mines in Germany was not available, especially as production may have been decreasing as these mines continue to get nearer to their expected closure dates (table 2; Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 55-56; Bundesministerium für Wirtschaft und Technologie, 2010a, p. 11, 15; Gesamtverbands Steinkohle e.V., 2010, p. 10-14; RWE Aktiengesellschaft, 2010, p. 1, 32, 80).

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Mineral Trade

Data on exports and imports of selected mineral commodities in 2008 (the latest year for which data were available) are provided in tables 3 and 4, respectively. In 2008, Germany produced enough potash to account for 100% of the country's domestic demand (volume) and was able to export about four times (432%) the domestic volume of consumption; the same was true for the country's production and exports of sulfur (69%), gypsum and anhydrite (31%), aggregates (6%), salt (6%), limestone and dolomite (1%), and lignite (0.6%). In addition to being 100% dependent on imports of metallic ores and concentrates, Germany also imported 100% of the magnesite; natural graphite; phosphates; and soapstone, steatite, and talc consumed in the country. In addition, imports accounted for 97% of the country's consumption of crude petroleum; 88%, of fluorspar; 84%, of natural gas; 78%, of barite; 72%, of hard coal; 48%,[2] of refined copper; 47%,[2] of aluminum; 44%, of bentonite; 28%,[2] of refined lead; 9.5%, of feldspar; and 4.3%, of kaolin (tables 3, 4; Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 39-41).

Although Germany has traditionally attempted to import minerals from as diverse a number of source countries as possible, the country has had to depend on individual countries for close to 80% (or even more) of certain minerals during one or more years between 2000 and 2009. For at least 1 year during this timeframe, Brazil had accounted for 80% or more of Germany's imports of ferroniobium; Chile had accounted for that of lithium carbonate; China had accounted for that of antimony, barite, ferrotungsten and (or) tungsten oxides and hydroxides; fluorspar, graphite, manganese, and rare earths; Guinea had accounted for that of bauxite; and South Africa had accounted for that of chromite, ferrochromium, and (or) the PGMs iridium, osmium, platinum, and (or) ruthenium. According to an analysis of the concentration of mineral supply by country (using an index indicator based on the Herfindahl-Hirschman Index) combined with the country risk ratings of the World Bank's Aggregate Governance Index, the EC determined that enough of a supply risk to EU countries existed for supplies of antimony, beryllium, cobalt, fluorspar, gallium, germanium, graphite, indium, magnesium, niobium, PGMs, rare earths, tantalum, and tungsten to rate these minerals as "critical." In addition to this possible "source country risk," Germany and the EC also expressed concern regarding the possibilities of certain minerals being produced by only a few companies worldwide. Some minerals that were considered by either the EC or Germany's BGR to have a notably high level of corporate concentration in their global production from 1998 through 2008 included numerous industrial minerals, iron ore that is shipped overseas, niobium, PGMs, rare earths, rhenium, and tantalum (table 4; Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 21-24, 41-49; Bundesministerium für Wirtschaft und Technologie, 2010b, p. 6-15, 26-27; 2010c, p. 6-7, 25; European Commission, 2010, p. 5-7, 23-27, 34-35).

[2]Includes use of primary refined metal that was produced in Germany from imported mineral raw materials.

Commodity Review

Metals

Aluminum.—During the second quarter of 2009, Norsk Hydro temporarily shut down about 185,000 t/yr of primary aluminum production capacity at the company's Rheinwerk plant at Neuss, and about 700 employees there were given reduced working hours. This restructuring resulted in a decrease in production to 82,000 t of primary aluminum in 2009 by the Rheinwerk primary smelter compared with production of 234,000 t in 2008. In April 2009, the company announced that it was considering shutting down the primary aluminum smelter completely because of high electricity rates in Germany and continuing low demand for aluminum, and Norsk Hydro reported that the company was still discussing this closure through the end of the year and into 2010. Norsk Hydro also owned 50% of Aluminium Norf GmbH (AluNorf) at Neuss, which reportedly operated the leading aluminum hot-rolling mill in the world, and the total number of Norsk Hydro employees in Germany decreased to 4,417 at the end of 2009 compared with 4,553 at yearend 2008 (Hogan, 2009b; Norsk Hydro ASA, 2010, p. 20, 27, 30, 46, 56).

Trimet did not appear to close any aluminum plants completely in 2009, and the company also arranged for employees to work part time during 2009. The number of Trimet employees from July 1, 2008, through June 30, 2009, decreased to 1,548 from 1,569 during the same period from mid-2007 though mid-2008, and the number of employees at the company that underwent additional training (while working part time) increased by about 18% during this timeframe. Trimet reported that the company's production of primary aluminum during the first half of 2009 was (at most) about 60% of production capacity, on average, and that the company's plant at Essen produced at about 45% and the Hamburger Aluminium-Werke (HAW) plant produced at about 70% of their primary aluminum production capacities. Trimet reportedly expected to increase production of primary aluminum at Essen to more than 50% of production capacity, but information on actual production volumes during all of 2009 was not available (Gesamtverband der Aluminiumindustrie e.V., 2009; Hogan, 2009a; Trimet Aluminium AG, 2009, p. 2, 16-17, 28-29, 36-40; Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 65-66).

Aleris International Inc. of Beachwood, Ohio was expected to emerge from Chapter 11 bankruptcy proceedings as a privately owned company on or around June 1, 2010. The company's Europe segment claimed that its operations were not significantly interrupted by the bankruptcy proceedings in the United States. Separate information concerning the actual production of secondary aluminum by Aleris's subsidiary in Germany (Aleris Recycling [German Works] GmbH) was not available (Aleris Europe, 2009; Aleris International Inc., 2010).

Copper.—In 2009, about 57% of Germany's production of refined copper was used in electronics and for cables, 15% was used in construction, and 8% was used in the mechanical engineering sector. During fiscal year 2009, which ran from October 1, 2008, through September 30, 2009, Aurubis AG produced 571,000 t of copper cathodes at the company's main

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production sites in Hamburg and Luenen (Germany), and this production was not significantly less than the total of 572,000 t of copper cathodes produced at the same locations during fiscal year 2007, which ran from the beginning of October 2006 through the end of September 2007. Separate data on production of copper cathodes at Aurubis's copper cathode production sites in Germany during fiscal year 2008 was not available, but the company expected its production of copper cathodes in Germany to increase slightly during fiscal year 2010. During 2009, Aurubis did employ part-time workers at its copper production sites in Germany and also hired 58 new apprentices and 13 new trainees to work at its main primary copper production facilities in Hamburg. By December 15, 2009, Salzgitter had purchased enough shares to increase its ownership share in Aurubis to about 25% (Aurubis AG, 2009, p. 7, 11, 27, 66-68; 2010, p. 48, 66; Norddeutsche Affinerie AG, 2009, p. 62-63; Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 66-68).

Iron and Steel.—About 12,500 employees of ThyssenKrupp AG in Germany worked part time in 2009, and most of these were in the company's steel segment. ThyssenKrupp expected to reduce part-time working in the company significantly towards the end of the year. Each year, on average, about 40% of the company's steel products are sold to the automobile sector. In 2009, the value of orders for ThyssenKrupp's crude steel output decreased by about 41% compared with that of 2008, and the company reacted by shutting down production capacity for repairs. In March 2009, ThyssenKrupp shut down the company's blast furnace 9, which had a production capacity of 4,500 metric tons per day of hot iron metal; temporarily shut down blast furnace A at the company's 50%-owned subsidiary Hüttenwerke Krupp Mannesmann GmbH (HKM); and operated the company's other three blast furnaces at minimum levels through the end of July. ThyssenKrupp gradually increased the capacity utilization at these last three blast furnaces and restarted the production of blast furnace 9 on November 1, 2009. In 2009, ThyssenKrupp's production of crude steel (not including the company's share of production by HKM) decreased by 35% (to 9.2 Mt of crude steel) compared with that of 2008. As of September 30, 2009, the steel segment of ThyssenKrupp employed 39,156 people compared with 41,311 employees on the same date in 2008. The company expected that its restructuring in 2009 would make it a more efficient producer in 2010 and beyond (Gerlach, 2009; ThyssenKrupp AG, 2009, p. 6, 79-81, 103, 112-113; Stahlinstitut VDEh and Wirtschaftsvereinigung Stahl, 2010, p. 43).

After ThyssenKrupp, the three top producers of crude steel in Germany in 2009 had the following production levels and levels of employment in the country: ArcelorMittal produced a total of 5.3 Mt of crude steel and had about 7,600 employees in Germany compared with 8.2 Mt of crude steel and 7,800 employees in the country in 2008; Salzgitter produced 4.9 Mt of crude steel and had about 24,000 employees compared with 7 Mt and about the same number of employees in the country in 2008; Hüttenwerke Krupp Mannesmann produced 2.8 Mt of crude steel and had about 3,000 employees compared with 5.2 Mt of crude steel and about the same number of employees in 2008. In March 2009, Salzgitter temporarily shut down blast furnace C, which had a capacity of 1,900 metric tons per day of pig iron, but the company kept its other two larger blast furnaces (A and B) running. In 2009, Salzgitter experienced about a 40% decrease in orders for steel, and crude steel production capacity utilization was about 50% at some of the company's operations. The iron and steel sector in Germany did not experience a significant drop in the number of permanent employees, overall, because of Kurzarbeit policies and allowing employees to use up accrued working credits during the widespread decreases in production (mostly in response to decreased demand from the transportation and mechanical engineering sectors in the country). The iron and steel sector did appear to have a decrease in the number of trainees in 2008 and 2009, however, unlike in some other sectors of the mineral industry (Stahlinstitut VDEh and Wirtschaftsvereinigung Stahl, 2009, p. 24-26, 29-30, 34-36; 2010, p. 12-14; 24-26, 29-30, 34-36; Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 58-61; Salzgitter AG, 2010, p. 85, 91, 103).

Lead.—Annually, replacement of vehicle batteries accounts for about 40% of the world's demand for lead, and there was reportedly a substantial increase in battery demand in Europe in early 2009 [which could have been owing to more people attempting to extend the useful life of their existing vehicles (requiring new batteries) for a longer period of time during the economic recession combined with harsher winter weather conditions that may have required a greater intensity of battery use than during early 2008]. In Germany, about 100,000 t of lead contained in batteries is recycled every year, although more specific data on actual recovery of lead from batteries in the country in 2009 were not available. Berzelius was believed to be one of the leading producers of secondary lead in the world, although reliable information on the world's secondary production of lead by company was not available. In 2009, Recylex S.A. operated in Belgium, France, and Germany, and claimed to be the third ranked producer of lead metal in Europe. The company also cited the weather conditions in Europe during 2009 as being conducive to battery replacement, and Recylex processed slightly greater than 131,000 t of batteries compared with about 122,000 t in 2008. Despite the increase in the tonnage of batteries processed, Recylex decreased production to about 120,000 t of lead metal compared with 136,000 t in 2008, and most of this production during both years was at the company's lead processing facilities in Nordenham. Recylex combines lead recovered from secondary sources (mostly batteries) with lead from ore in the company's production of lead metal, but information concerning the exact proportion of primary lead was not available (Taylor, 2009; Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 68-70; Recylex S.A., 2010, p. 2, 8-11).

Zinc.—In addition to the drastic reduction in production of both primary and secondary zinc metal attributable to the closure of Ruhr-Zink at the end of 2008, Xstrata decreased production of zinc metal at the company's Nordenham smelter by about 13% as part of a restructuring of the company's global zinc business during the first half of 2009. During the second half of 2009, however, Xstrata increased production at Nordenham, and this facility ended up producing 140,615 t of zinc metal during the entire year, which was only about 3% less

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than the 144,994 t produced by the company at Nordenham in 2008. During 2008, GEA Group AG attempted to find a buyer for Ruhr-Zink but ended up closing Ruhr-Zink's plant in Datteln on December 31, citing significant losses by Ruhr-Zink during the year. During the first half of 2009, Recylex did not recycle any zinc-enriched steel mill dust until after April, and the company produced about 43,000 t of Waëlz oxides during the entire year compared with 73,000 t in 2008. (The company then sold these zinc oxides to zinc producers to produce zinc ingots, but information concerning the exact locations where this secondary zinc metal was finally produced was unavailable.) In 2009, Recylex produced only about 22,000 t of zinc oxides from scrap zinc compared with 31,000 t in 2008 because the company temporarily closed its secondary zinc plant in Oker-Goslar during part of 2009. Recylex sold almost all the high-purity zinc oxides that it produced from spent zinc to manufacturers of cosmetics, glass, pharmaceuticals, and tires (GEA Group AG, 2009, p. 4, 30, 118-119; Recylex S.A., 2009, p. 1, 63; 2010, p. 1-4, 12-15; Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 70-71; Xstrata plc, 2010, p. 5, 11, 14-15, 19, 26, 43, 87-91, 95).

Industrial Minerals

Cement.—In 2009, production by companies in the construction sector (including cement companies and producers of minerals used intensively in construction projects) could have depended on the efficacy of Government stimulus measures to increase the number of construction projects (including infrastructure projects) and on the extent of possible construction in excess of demand (overbuilding) before the economic downturn. Also, if Governments spent almost all of the stimulus funds before 2009 (or early in 2009) and only had large debts for a significant portion of 2009 (or expected to in 2010), then this could have lead to cutbacks in publically funded construction and infrastructure projects, which might have negatively affected production by companies in the construction sector. HeidelbergCement estimated that Government stimulus programs in both Europe and in the United States did not appear to have had a sufficiently strong effect on the construction sectors in either location in 2009, although the company expected that the full effect of stimulus measures on the production of its subsidiaries might not be felt until sometime in 2010. HeidelbergCement reported that the company's volume of sales of cement in Germany in 2009 was only slightly lower than that of 2008, although information on individual companies' actual tonnages of annual production in the country was not available. Production of limestone and dolomite for use in the manufacturing of cement in Germany decreased to about 43.3 Mt compared with 50.8 Mt in 2008, and this decrease in production was consistent with the decrease of about 9.4% in the production of cement in the country during this timeframe (Simonian, 2008; Hammond, 2009; Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 77; HeidelbergCement AG, 2010, p. 26-27, 47-48, 66-73)

Clay and Shale.—Production of specialty clays, including ceramic and refractory clays, took place in almost all the States of Germany, but the greatest share of the country's total production of specialty clays happened in the State of Rhineland-Palatinate, which includes almost all the Westerwald region. In 2009, marketable production of specialty clays in Rhineland-Palatinate totaled 2.8 Mt compared with about 3.1 Mt in 2008, about 1.2 Mt was produced in the State of Bavaria (the second ranked State for the production of specialty clays in the country) compared with about 1.3 Mt in 2008, and slightly less than 0.8 Mt was produced in the State of Baden-Württemberg (the third ranked State) compared with 1.0 Mt in 2008. The kaolinitic clays of the Westerwald region also appear to be used mostly in ceramics, and it was not clear if most of the production of kaolinitic clays in the Westerwald region was classified as kaolin or as specialty clays. Demand for ceramic clays produced in Germany (including in one of the Westerwald's apparently leading sales markets—tile manufacturing in Italy) appeared to decrease during the economic downturn, whereas demand for kaolin produced in Germany appeared to increase during the same timeframe. The leading market for clays classified as kaolin in Germany appeared to be for use in the manufacturing of paper. Marketable production of kaolin in Bavaria increased to 3.2 Mt compared with about 2.2 Mt in 2008, and that in the State of Saxony decreased to about 1.2 Mt compared with 1.3 Mt in 2008. In 2008 and 2009, marketable production of clays classified as kaolin took place in only five States in Germany, and that in Bavaria and Saxony accounted for slightly greater than 98% of the country's total marketable production of kaolin in 2009. By far the leading region for production of kaolin in Germany was the upper palatinate region in Bavaria (Arbeitsgemeinschaft Westerwald-Ton e.V., 2009, 2010; Roberts, 2009; Bundesministerium für Wirtschaft und Technologie, 2009, p. 55-59; 2010a, p. 26-29, 54-58; Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 75-78; Bundesverband Keramische Rohstoffe und Industrieminerale e.V., 2010, p. 8-18).

Potash.—In 2009, K+S AG responded to a considerable shift in the relative demand for the company's production of potash to outside of its traditional European market. In 2009, K+S AG's sales of potash and magnesium products outside of Europe accounted for 56.1% of revenues from this segment of the company's business compared with 37.3% in 2008, that within Europe (excluding Germany) accounted for just 31.6% compared with 49% in 2008, and that just within Germany still accounted for 12.3% compared with 13.7% in 2008. The leading cause of this shift appeared to be an increase in company sales of potash to China. Germany exported about 170,000 t of potash to China during the first quarter of 2009, which was estimated to be about three times as much as during the same period in 2008. The substantial increase in China's demand for potash from Germany appeared to be mostly owing to a drought in China coupled with lags in negotiations between Chinese buyers and the world's leading potash suppliers, including those sourcing potash from Belarus, Canada, Israel, and Russia. All the potash produced by K+S AG in 2009 was from six mines in Germany, and the company's total marketable production of potash during the entire year decreased by about 44% compared with that of 2008. About 88% of K+S AG's employees in the company's potash and magnesium products business segment in Germany

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had to work part time, but the company only had to decrease the number of employees in this segment to 7,818 compared with 7,845 in 2008. With the help of the Federal Government's Kurzarbeit working program in 2009, K+S AG increased the percentage of (initial) trainees in the company's total workforce in Germany to 6.3% compared with 6% in 2008, and 6,977 existing employees participated in further education and training programs with K+S AG compared with 5,550 in 2008 (Helmer, 2009; Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 74, 86, 169; Bundesministerium für Wirtschaft und Technologie, 2010a, p. 23-25; K+S Aktiengesellschaft, 2010a, p. 5-7, 26-34; 2010b, p. 76-80, 87-88, 112-114, 149).

Salt.—In 2009, it appeared as if Südsalz GmbH (a 90%-owned subsidiary of Südwestdeutsche Salzwerke AG) increased production of rock salt and unspecified (nonindustrial) salt brines in Germany to about 4 Mt compared with about 3 Mt in 2008, and esco-european salt company GmbH & Co. KG (a 100%-owned subsidiary of K+S AG) appeared to increase production of the same classification of salt products in the country to 4.5 Mt compared with about 3.5 Mt during this timeframe. In 2009, the combined production by these two companies accounted for about 96% of the total production of rock salt and unspecified brines in Germany, and both companies cited the average increase in severity and duration of the winter conditions in Europe in 2009 as the primary reason for the increased demand for their salt products. According to a measure of degree days, 2009 in Germany was estimated to have been about 2% colder than 2008 in the country, on average (Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 74-75, 187; Bundesministerium für Wirtschaft und Technologie, 2010a, p. 9, 25-26; K+S Aktiengesellschaft, 2010b, p. 11, 30, 58, 62-64; Südwestdeutsche Salzwerke AG, 2010, p. 40-41).

Mineral Fuels

Coal.—Hard coal mining was centered in the Ibbenbüren, the Ruhr, and the Saar coalfields in Germany and was uneconomical without a subsidy. The Lippe and the Walsum Mines were located in the Ruhr coal mining district, and their closures resulted in a decrease of production in the Ruhr district to 10.9 Mt of anthracite and bituminous coal compared with 14.2 Mt in 2008. The Federal Government's program to eliminate subsidies for hard coal mining by 2018 came into effect on December 28, 2007, and the plan was to be reviewed in 2012 to determine whether it should be amended. An economic consequence of decreasing production of hard coal domestically is that Germany will become more dependent on costly imported coke and coking coal from hard coal mines outside of the country, and this will subject sectors of the mineral industry, such as steel manufacturing, and other sectors of the economy to greater cost uncertainty. In 2009, Germany's production of coke from hard coal decreased to about 6.8 Mt compared with about 8.2 Mt in 2008, and the average price of German imports of coking coal increased to $242 per metric ton compared with about $186 per metric ton in 2008. The decrease in steel production in the country, however, was held mostly responsible for a 32% decrease in Germany's consumption of coke and coking coal during this timeframe, and this led to a decrease in imports of coke from hard coal to about 3 Mt from 5 Mt in 2008 and a decrease in imports of coking coal to 6.8 Mt from about 9.5 Mt in 2008 (Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 27, 53-55, 85, 90-91; Bundesministerium für Wirtschaft und Technologie, 2010a, p. 9-14; Gesamtverbands Steinkohle e.V., 2010, p. 7-8, 11, 41, 54).

Electricity consumption was a subset of primary energy consumption in Germany, and combustion of lignite accounted for 24.6% of the electricity supply in the country in 2009. (Nuclear fuel accounted for 22.6% of the electricity supply in Germany in 2009; hard coal, 18.3%; natural gas, 13%; and renewable energy, 15.6%, including 6.4% by wind power and 3.2% by hydroelectric power.) In 2009, 153.4 Mt of lignite was used to produce electricity in the country compared with 159.4 Mt in 2008. In 2009, there were about 22,600 total workers employed in the lignite sector, including about 16,600 employed in enterprises that mined lignite and about 6,000 employed in powerplants that burned lignite to generate electricity, and this was slightly greater than approximately 22,500 total workers, including 16,530 and about 5,950, respectively, in 2008. In 2009, RWE produced about 92 Mt of lignite compared with 96 Mt in 2008 at the company's Garzweiler, Hambach, and Inden Mines in the Rhineland, which was the main region for production of lignite by RWE and for Germany (Bundesministerium für Wirtschaft und Technologie, 2009, p. 15; 2010a, p. 9-11, 14-16; Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 21, 50, 55-57; RWE Aktiengesellschaft, 2010, p. 80).

Natural Gas.—In 2009, consumption of natural gas in Germany decreased by about 5.5% compared with that of 2008 owing to a decrease in consumption by German industry (including companies in the mineral industry) and powerplants that burn natural gas to generate electricity. Although RWE was the leading producer of electricity in Germany, E.ON AG appeared to have been the leading energy utility company in the country, and this may have been owing to E.ON possibly providing a greater total amount of energy contained in natural gas as well as electricity to consumers than did RWE. In 2009, most of the natural gas stored and (or) distributed by E.ON in Germany appeared to be procured from other natural gas production companies, although E.ON did appear also still to be producing natural gas in the North Sea. The company procured natural gas from companies in Norway (which accounted for 27% of E.ON's total procurement of natural gas in 2009), Russia (26%), Germany (22%), and the Netherlands (15%). In 2009, domestic production accounted for about 16% of Germany's total consumption of natural gas (which was approximately the same percentage as in 2008), and production in the State of Lower Saxony accounted for about 94% of the country's total production of natural gas. In 2009, the leading producers of natural gas in Germany were BEB Erdgas und Erdöl GmbH (which produced 6.3 billion cubic meters), Mobil Erdgas-Erdöl GmbH (3.5 billion cubic meters), and RWE-Dea AG (2.2 billion cubic meters). The leading field for the production of natural gas in the country was the Rotenburg-Taaken complex of fields in Lower Saxony (co-owned by Mobil Erdgas-Erdöl and RWE-Dea), which produced about 2.3 billion cubic meters

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of natural gas and accounted for about 15% of the total production of natural gas in Germany in 2009 (Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 49-53; Bundesministerium für Wirtschaft und Technologie, 2010a, p. 18-20; E.ON AG, 2010, p. 4, 10, 15, 46; Landesamt für Bergbau, Energie und Geologie, 2010, p. 34-38).

Reserves and Resources

At the end of 2009, Germany's reserves of lignite were estimated to be 40.6 billion metric tons (Gt), and this preliminary figure was equal to the estimated lignite reserves at yearend 2008; the country's reserves of natural gas were estimated to have decreased to 162 billion cubic meters compared with about 194 billion cubic meters in 2008; and its reserves of crude petroleum were estimated to be 301 million barrels (Mbbl) (converted from a reported figure of 41.131 Mt) compared with 249 Mbbl (33.981 Mt) in 2008. At the end of 2008 (the latest year for which reliable data were available), K+S AG estimated company reserves of potash (K_2O content) to be slightly greater than 147 Mt and the company's reserves of salt in Germany to be about 206 Mt. Reliable information concerning additional reserves of industrial minerals in the country was not available (Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, p. 25, 168; 2010, p. 51-55, 190, 192-193, 202; Bundesverband Braunkohle e.V., 2009; Bundesministerium für Wirtschaft und Technologie, 2010a, p. 17, 19; K+S Aktiengesellschaft, 2010b, p. 243-244; Landesamt für Bergbau, Energie und Geologie, 2010, p. 39-42).

Assuming that the phasing out of the Federal Government's subsidy of hard coal production would proceed according to the schedule as it stood in 2009, this policy will gradually increase the volumes of hard coal resources in Germany that are not economical to mine until the end of 2018, when zero hard coal in the country is expected to be economically profitable to produce. In 2009, however, the Government had an estimate of how much hard coal would be produced in 2010 and through 2018 (conditional on the subsidies allowing it to be economic to do so), and considered this estimated future production to represent a type of reserve figure for hard coal in Germany. Under this definition, the country's economically exploitable reserves of hard coal (in the presence of planned subsidies) were estimated to be about 73 Mt at the end of 2009 compared with about 99 Mt at yearend 2008, and the country's annual production of hard coal was expected to be the primary reason for annual decreases in reserves until the end of 2018. In 2009, the country's hard coal resources remained at approximately 83 Gt, which was the same as the hard coal resource estimate in 2008 (Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, p. 25, 160; 2010, p. 196).

Outlook

German Government and EU policies are expected to have a strong influence on the future of the mineral industry in Germany, especially in the realm of securing supplies of mineral raw materials (including scrap) and enabling provision of electrical power at prices that could help keep the companies in the country's mineral industry internationally competitive. Consumption of mineral fuels produced and distributed in Germany decreased substantially during the downturn, but E.ON, RWE, and other energy companies expected that demand for mineral fuels, such as coal and natural gas, would increase again in 2010 and beyond. This could be because of evolving constraints on the development of alternative energy sources, such as uncertainty in Germany's ability to secure rare-earth elements from China for a planned expansion in construction and installation of wind turbines or limits on Germany's use of solar technology owing to the typically cloudy weather conditions in the country (and the costliness of installing the infrastructure necessary to transmit solar power from more sunny regions); increased development and use of clean coal technologies in the country; ongoing efforts by the EU to decrease use of nuclear power within the region; and (or) additional factors. RWE expected that the company would complete construction and startup a modern lignite-fired powerplant in Neurath (near Cologne) sometime in 2011 and that this new powerplant would increase demand for (and the company's production of) lignite in Germany. At least until yearend 2012, however, it did appear to be fairly certain that Germany would continue to proceed towards elimination of the production of hard coal in the country by 2018, including planned closures of the Ost Mine on September 30, 2010, the Saar Mine on July 1, 2012, and the West Mine at the end of 2012. This would leave only three mines producing hard coal in Germany in 2013 (Watson, 2009; Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, p. 23-24; E.ON AG, 2010, p. 48-51; Gesamtverbands Steinkohle e.V., 2010, p. 12-14, 35-38, 41-51; RWE Aktiengesellschaft, 2010, p. 77, 105-112).

During the economic downturn, many mineral companies in Germany were able to avoid permanent closures of production capacity and to retain most of their permanent highly trained employees; possibly to increase efficiencies through (re)training of workers, purchase more modern equipment, and improve processing technologies; invest in research and development of new mineral-based products; and find new uses for existing products to stay competitive in the evolving global market for minerals. Many new uses for industrial minerals produced in Germany are continuing to be investigated, such as increasing the use of various industrial minerals in waste remediation (including using more bentonite to help with nuclear disposal) and in sequestration of carbon dioxide. Metal foundries are important users of such industrial minerals as bentonite and silica, and expected increases in foundry production in 2010 and beyond could have a corresponding effect on levels of production of these industrial minerals in the country. Similarly, other industrial minerals produced in Germany are used in the country's metallurgical sector (such as fluorspar being used in the manufacturing of both aluminum and steel), and expected increases in production of these metals in the country in 2010 could correlate with increased production of these industrial minerals (Gesamtverband der Aluminiumindustrie e.V., 2009; Hawley, 2009a, b; Bundesministerium für Wirtschaft und Technologie, 2010a, p. 26-30).

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In the latter part of 2008 and early 2009, the continuing economic downturn caused a decrease in demand for the mineral-based products that Germany produces mainly in the construction, mechanical engineering, and transportation sectors. The steel sector (and production of associated ferroalloys used in specialty steels, and so forth) was particularly hard hit because this sector relies heavily on demand from all these sectors. In 2010, significant economic recovery was expected in the transportation (automobile industry) and mechanical engineering sectors, but the construction sector was not expected to increase production significantly until sometime in 2011, depending on the timing of expected effects from stimulus measures and public spending on construction projects. Thus, significant increases in Germany's production of such construction mineral materials as cement, gypsum, and certain clays were not expected until 2011, and production of nonferrous metals in the country was expected to increase in 2010. The outlook for Germany's production of steel in 2010 was also very positive, but production of steel in the country was not expected to reach 2007 levels until after 2011. Even if demand for the products of Germany's mineral industry increases, however, the costs of raw materials were expected also to increase, and the mineral industry companies in the country will continue to face both country-specific and supplier company-specific risks in securing a supply of mineral raw materials. As an example of the company-specific risks faced by the steel industry, more than 50% of the world's coking coal was produced by just four companies worldwide, and 60% of the world's overseas shipments of iron ore were supplied by just three companies in 2009. Since the closure of Ruhr-Zink, production of primary zinc metal in Germany appears unlikely to increase much above the 2009 level, although production of secondary zinc could increase, especially if there is an increase in steel production (European Confederation of Iron and Steel Industries, 2010; Gesamtverbands Steinkohle e.V., 2010, p. 54-55, 61; Schäfer, 2010; Stahlinstitut VDEh and Wirtschaftsvereinigung Stahl, 2010, p. 3).

Future levels of production of fertilizer minerals (such as potash) in Germany was expected to vary more with respect to fluctuations in demand outside of Europe, whereas the country's production of salt was expected to be more closely correlated with demand inside Europe. In 2010 and beyond, K+S expected increases in the global population and in the level of prosperity in emerging market economies, including those of Latin America and Southeast Asia. In addition to this growth leading to an expected increase in the intensity of land cultivation overall, the company also expected that consumption patterns in these countries would continue to include increases in meat consumption, which would increase the need for animal feed and therefore increase demand for almost all of the company's fertilizer products (including potash) even more than just an increase in the total level of food consumption. In 2009 and into 2010, the company was reportedly examining projects to enhance its base stock of available mineral raw materials to help it increase production in response to expected increases in global demand for the company's production of potash and other fertilizer materials, but information concerning company approval of a specific project was not available (K+S Aktiengesellschaft, 2010b, p. 141-150).

References Cited

Aleris Europe, 2009, Aluscope: Koblenz, Germany, Aleris Europe, Edition 01/2009, 20 p.

Aleris International Inc., 2010, Aleris International's plan of reorganization confirmed by bankruptcy court—Company set to emerge from Chapter 11 on or about June 1: Beachwood, Ohio, Aleris International Inc. press release, May 13, 2 p.

Arbeitsgemeinschaft Westerwald-Ton e.V., 2009, WBB Fuchs GmbH unter neuem namen: Koblenz, Germany, Arbeitsgemeinschaft Westerwald-Ton e.V., Die Tonleiter, no. 16, February, 3 p.

Arbeitsgemeinschaft Westerwald-Ton e.V., 2010, Konjunkturelle situation der tonindustrie im Westerwald: Koblenz, Germany, Arbeitsgemeinschaft Westerwald-Ton e.V., Die Tonleiter, no. 19, April, 3 p.

Atkins, Ralph, 2010, China to overtake Germany as biggest exporter: London, United Kingdom, The Financial Times Ltd., January 9. (Accessed February 2, 2010, at http://www.ft.com/cms/s/0/447e3cb4-fcbf-11de-bc51-00144feab49a.html.)

Aurubis AG, 2009, Annual report 2008/09: Hamburg, Germany, Aurubis AG, December 14, 175 p.

Aurubis AG, 2010, Annual report 2009/10: Hamburg, Germany, Aurubis AG, December 14, 168 p.

Braithwaite, T., Benoit, B., and Atkins, R., 2009, Germany offers hope of global recovery: London, United Kingdom, The Financial Times Ltd., August 18. (Accessed September 28, 2009, at http://www.ft.com/cms/b6b68b00-8bdc-11de-b14f-00144feabdc0.html.)

Bryant, Chris, 2009, German unions put imprint on stimulus package: London, United Kingdom, The Financial Times Ltd., February 18. (Accessed March 5, 2009, at http://www.ft.com/cms/fb6dc268-fd48-11dd-a103-000077b07658.html.)

Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, Rohstoffsituation 2008: Hannover, Germany, Bundesanstalt für Geowissenschaften und Rohstoffe, October, 228 p.

Bundesanstalt für Geowissenschaften und Rohstoffe, 2010, Rohstoffsituation 2009: Hannover, Germany, Bundesanstalt für Geowissenschaften und Rohstoffe, November, 205 p.

Bundesministerium der Justiz, 2007, Bundesberggesetz (BBergG): Berlin, Germany, Bundesministerium der Justiz, April 29, 95 p.

Bundesministerium für Wirtschaft und Technologie, 2009, Der Bergbau in der Bundesrepublik Deutschland 2008: Berlin, Germany, Bundesministerium für Wirtschaft und Technologie, October, 174 p.

Bundesministerium für Wirtschaft und Technologie, 2010a, Der Bergbau in der Bundesrepublik Deutschland 2009: Berlin, Germany, Bundesministerium für Wirtschaft und Technologie, October, 174 p.

Bundesministerium für Wirtschaft und Technologie, 2010b, In focus—Germany as a competitive industrial nation—Building on strengths, overcoming weaknesses, securing the future: Berlin, Germany, Bundesministerium für Wirtschaft und Technologie, October, 34 p.

Bundesministerium für Wirtschaft und Technologie, 2010c, The German Government's raw materials strategy—Safeguarding a sustainable supply of non-energy mineral resources for Germany: Berlin, Germany, Bundesministerium für Wirtschaft und Technologie, October, 26 p.

Bundesverband Braunkohle e.V., 2009, Braunkohle in Deutschland 2008: Cologne, Germany, Bundesverband Braunkohle e.V., February, 2 p.

Bundesverband Keramische Rohstoffe und Industrieminerale e.V., 2010, Geschäftsbericht 2009/2010: Koblenz, Germany, Bundesverband Keramische Rohstoffe und Industrieminerale e.V., April 23, 22 p.

Casteel, Kyran, 2010, Best of Germany 2010—A supplement to Engineering & Mining Journal: Jacksonville, Florida, Engineering & Mining Journal, Mining Media Inc., July-August, 56 p.

Commission of the European Communities, 2008, The raw materials initiative—Meeting our critical needs for growth and jobs in Europe: Brussels, Belgium, Commission of the European Communities, communication from the commission to the European Parliament and the council, COM(2008) 699, Doc. 16053/08, November 4, 13 p.

Commission of the European Communities, 2010, State aid—Commission opens in-depth investigation into subsidies for producers of non-ferrous metals in Germany: Brussels, Belgium, Commission of the European Communities press release IP/10/1520, November 17, 2 p.

El-Sharif, Yasmin, 2009, The party's over for German carmakers—No more cash for clunkers: Spiegel Online, SPIEGELnet GmbH, September 3. (Accessed May 4, 2010, at http://www.spiegel.de/international business/0,1518,646716,00.html.)

Digitized by Google

E.ON AG, 2010, Annual report part II/II—2009 financial report: Düsseldorf, Germany, E.ON AG, February 26, 172 p.
European Commission, 2010, Critical raw materials for the EU—Report of the ad-hoc working group on defining critical raw materials: Brussels, Belgium, European Commission, June 17, 85 p.
European Confederation of Iron and Steel Industries, 2010, Economic and steel market outlook 2010-2015—Q2-2010 report from EUROFER's economic committee: Brussels, Belgium, European Confederation of Iron and Steel Industries, April 26, 15 p.
European Parliament and Council, 2009, Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community: Luxembourg, Official Journal of the European Union, L 140, June 5, p. 63-87.
GEA Group AG, 2009, Annual report 2008: Bochum, Germany, GEA Group AG, March 10, 210 p.
Gerlach, Marilyn, 2009, ThyssenKrupp repeats gloomy 2008/09 profit view: Thomson Reuters, January 23. (Accessed January 26, 2009, at http://www.forexpros.com/news/financial-news/update-2-thyssenkrupp-repeats-gloomy-2008-09-profit-view-23115.)
Gesamtverband der Aluminiumindustrie e.V., 2009, Metal foundries expecting weak 2009: Düsseldorf, Germany, Gesamtverband der Aluminiumindustrie e.V. news release, May 28, 1 p.
Gesamtverbands Steinkohle e.V., 2010, Steinkohle jahresbericht 2010: Essen, Germany, Gesamtverbands Steinkohle e.V., October, 70 p.
Global Intelligence Report, The, 2010, Russia-Germany—Nord Stream Pipeline under way: Washington, D.C., Global Intelligence Report, September 28. (Accessed January 15, 2011, at http://www.globalintelligencereport.com/articles/russia-germany-nord-stream-pipeline-under-way.)
Goulden, Jason, 2010, World exploration trends—A special report of the Metals Economics Group for the PDAC International Convention 2010: Halifax, Nova Scotia, Canada, Metals Economics Group, February 17, 8 p.
Hammond, Ed, 2009, Cement makers warn of 'painful adjustment' in Europe and US: London, United Kingdom, The Financial Times Ltd., December 30. (Accessed December 30, 2009, at http://www.ft.com/cms/s/0/d6f3b474-f4a5-11de-9cba-00144feab49a.html.)
Harvey, Fiona, 2009, EU carbon prices plummet as emissions fall: London, United Kingdom, The Financial Times Ltd., February 16. (Accessed April 28, 2009, at http://www.ft.com/cms/21ccd4ba-fc65-11dd-aed8-000077b07658.html.)
Hawley, George, 2009a, Minerals in waste remediation: Industrial Minerals, no. 503, August, p. 50-53.
Hawley, George, 2009a, Minerals key to locking emissions: Industrial Minerals, no. 501, June, p. 48-55.
HeidelbergCement AG, 2009, HeidelbergCement—Group presentation: Heidelberg, Germany, HeidelbergCement AG, presentation, August, 19 p.
HeidelbergCement AG, 2010, Annual report 2009: Heidelberg, Germany, HeidelbergCement AG, March 17, 160 p.
Helmer, John, 2009, German potash finds growth in China: Hong Kong, Asia Times Online (Holdings), Ltd., April 30. (Accessed May 8, 2009, at http://www.atimes.com/atimes/China_Business/KD30Cb01.html.)
Hogan, Michael, 2009a, Germany's Trimet raises aluminium output slightly: Thomson Reuters, June 3. (Accessed June 4, 2009, at http://uk.reuters.com/article/idUKL3103372320090603.)
Hogan, Michael, 2009b, Hydro sees late hope for German aluminium plant: Thomson Reuters, June 24. (Accessed June 25, 2009, at http://in.reuters.com/article/idINLO40766720090624.)
International Monetary Fund, 2010, Germany, *in* World economic outlook database: International Monetary Fund, October. (Accessed January 1, 2011, via http://www.imf.org/external/pubs/ft/weo/2010/02/weodata/index.aspx.)
K+S Aktiengesellschaft, 2010a, Corporate and sustainability report 2009: Kassel, Germany, K+S Aktiengesellschaft, March 11, 136 p.
K+S Aktiengesellschaft, 2010b, Financial report 2009: Kassel, Germany, K+S Aktiengesellschaft, March 10, 248 p.
Kanter, James, 2010, Carbon permits said to be in excess in Europe: The New York Times, April 1. (Accessed January 19, 2011, at http://www.nytimes.com/2010/04/01/business/energy-environment/01carbon.html.)
Kirschbaum, Erik, 2009, Govt incentives brighten German car outlook—VDA: Thomson Reuters, January 25. (Accessed January 26, 2009, at http://www.forexpros.com/news/forex-news/govt-incentives-brighten-german-car-outlook--vda-23320.)
Klesch & Company Ltd., 2009, Corus signs share purchase agreement with Klesch for sale of aluminium smelters: London, United Kingdom, Klesch & Company Ltd. news release, January 21, 1 p.
Kostick, D.S., 2010, Salt: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 134-135.
Landesamt für Bergbau, Energie und Geologie, 2010, Erdöl und Erdgas in der Bundesrepublik Deutschland 2009: Hannover, Germany, Landesamt für Bergbau, Energie und Geologie, April, 59 p.
McDonald, Joe, 2010, China overtakes Germany as biggest exporter: Seattle, Washington, The Seattle Times Company, January 9. (Accessed January 10, 2010, at http://seattletimes.nwsource.com/html/businesstechnology/2010754857_apaschinatrade.html.)
Norddeutsche Affinerie AG, 2009, Annual report 2007/08: Hamburg, Germany, Norddeutsche Affinerie AG, January 9, 188 p.
Norsk Hydro ASA, 2010, Annual report 2009: Oslo, Norway, Norsk Hydro ASA, March 17, 109 p.
Recylex S.A., 2009, Annual report 2008: Paris, France, Recylex S.A., April 27, 139 p.
Recylex S.A., 2010, Annual report 2009: Paris, France, Recylex S.A., March 19, 155 p.
Roberts, Jessica, 2009, Ceramic clays in the pan: Industrial Minerals, no. 501, June, p. 40-46.
RWE Aktiengesellschaft, 2010, Annual report 2009: Essen, Germany, RWE Aktiengesellschaft, February 12, 221 p.
Salzgitter AG, 2010, Annual report 2009: Salzgitter, Germany, Salzgitter AG, March 26, 259 p.
S&B Industrial Minerals S.A., 2010, Annual report 2009: Kifissia, Greece, S&B Industrial Minerals S.A., March 10, 140 p.
Schäfer, Daniel, 2009, Keeping the lights on: London, United Kingdom, The Financial Times Ltd., November 10. (Accessed February 2, 2010, at http://www.ft.com/cms/s/0/bd1e8620-ce2e-11de-a1ea-00144feabdc0.html.)
Schäfer, Daniel, 2010, German industry bullish on 2010 recovery: London, United Kingdom, The Financial Times Ltd., February 1. (Accessed February 2, 2010, at http://www.ft.com/cms/516d06f8-0f57-11df-a450-00144feabdc0.html.)
Scheben, Matthias, 2009, German energy policy remains greatest problem: Essen, Germany, Trimet Aluminium AG news release, October 2, 2 p.
Sibelco Deutschland GmbH, [undated], Global presence: Sibelco Deutschland GmbH. (Accessed January 23, 2011, at http://www.sibelco.de/en/silbelco/global-presence.html.)
Simonian, Haig, 2008, Cement industry suffers amid global downturn: London, United Kingdom, The Financial Times Ltd., November 13. (Accessed June 18, 2009, at http://www.ft.com/cms/s/0/46cf1e10-b0e5-11dd-8915-0000779fd18c.html#axzz1C670c1AX.)
Stahlinstitut VDEh and Wirtschaftsvereinigung Stahl, 2009, Commitment for steel 2009: Düsseldorf, Germany, Stahlinstitut VDEh and Wirtschaftsvereinigung Stahl, October, 47 p.
Stahlinstitut VDEh and Wirtschaftsvereinigung Stahl, 2010, Commitment for steel 2010: Düsseldorf, Germany, Stahlinstitut VDEh and Wirtschaftsvereinigung Stahl, October, 47 p.
Statistisches Bundesamt, 2006, Statistisches jahrbuch für die Bundesrepublik Deutschland 2006: Wiesbaden, Germany, Statistisches Bundesamt, September, 688 p.
Statistisches Bundesamt, 2009, Fachserie 4, reihe 3.1—Produzierendes gewerbe, produktion im produzierenden gewerbe—Jahr 2008: Wiesbaden, Germany, Statistisches Bundesamt, May 5, 320 p.
Statistisches Bundesamt, 2010a, Fachserie 4, reihe 3.1—Produzierendes gewerbe—Produktion des verarbeitenden gewerbes sowie des bergbaus und der gewinnung von steinen und erden 2009: Wiesbaden, Germany, Statistisches Bundesamt, May 17, 300 p.
Statistisches Bundesamt, 2010b, Fachserie 7, reihe 1—Außenhandel—Zusammenfassende übersichten für den außenhandel (vorläufige ergebnisse) 2009: Wiesbaden, Germany, Statistisches Bundesamt, July 22, 215 p.
Statistisches Bundesamt, 2010c, Statistisches jahrbuch für die Bundesrepublik Deutschland 2010: Wiesbaden, Germany, Statistisches Bundesamt, September 29, 745 p.
Süd-Chemie AG, 2010, Annual report 2009: Munich, Germany, Süd-Chemie AG, March 19, 268 p.
Südwestdeutsche Salzwerke AG, 2010, Konzern-Geschäftsbericht 2009: Heilbronn, Germany, Südwestdeutsche Salzwerke AG, April 8, 115 p.
Szabo, Michael, 2010, EU agrees on carbon permit auction rules from 2013: Thomson Reuters, December 18. (Accessed January 19, 2011, at http://www.reuters.com/article/idUSTRE66D3PQ20100714.)
Taylor, Michael, 2009, Lead up as Europe's drivers opt for new batteries: Thomson Reuters, January 8. (Accessed January 9, 2009, at http://www.reuters.com/article/idUSL651688120090108.)

Digitized by Google

ThyssenKrupp AG, 2009, Annual report 2008-2009: Düsseldorf, Germany, ThyssenKrupp AG, November 9, 276 p.
Trimet Aluminium AG, 2009, Geschäftsbericht 2008/2009, Essen, Germany, Trimet Aluminium AG, August 21, 58 p.
Virta, R.L., 2010, Clays: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 44-45.
Watson, N.J., 2009, German regulation threatens vital gas-infrastructure development: Petroleum Economist, v. 76, no. 11, November, p. 19-20.
WirtschaftsVereinigung Metalle e.V., 2010, Perspektiven—Geschäftsbericht 2009/2010: Berlin, Germany, WirtschaftsVereinigung Metalle e.V., April 15, 104 p.
World Steel Association, 2010, World steel in figures 2010: Brussels, Belgium, World Steel Association, July 13, 26 p.
Xstrata plc, 2010, Annual report 2009: Zug, Switzerland, Xstrata plc, March 2, 228 p.

TABLE 1
GERMANY: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008	2009
METALS						
Aluminum:						
Alumina[e]	thousand metric tons	830	850	1,000	900 [r]	900 [e]
Aluminum hydroxide, Al_2O_3 equivalent	do.	1,255	1,393	1,388	1,395	1,154
Metal:						
Primary		647,934	515,539	551,030	605,876	291,750
Secondary		718,291	795,668	857,619	720,898	560,755
Total		1,366,225	1,311,207	1,408,649	1,326,774	852,505
Cadmium, metal, refinery, including secondary[e]		640	640	400	420 [r]	278
Cobalt, matte, including shavings and scrap		601	686	685	913	654
Copper, metal:						
Smelter:						
Primary		257,200	273,800	270,200	295,000	251,100 [p]
Secondary		251,400	266,300	273,400	293,300	282,700 [p]
Total		508,600	540,100	543,600	588,300	533,800 [p]
Refined:						
Primary		293,812	312,092	301,702	300,470	290,200
Secondary		344,446	350,246	363,815	389,300	378,745
Total		638,258	662,338	665,517	689,770	668,945
Gallium, crude[e]		12	12	12	12	10
Indium, refined[e]		10	10	10	10	10
Iron and steel:						
Ore, run of mine:[2]						
Gross weight	thousand metric tons	360	416	422	455	364
Fe content	do.	38	44	44	48	38
Metal:						
Pig iron	do.	28,854	30,362	31,149	29,111	20,104
Direct-reduced iron	do.	440	580	590	520	380
Ferroalloys:						
Ferrochromium		22,672	26,710	22,030	26,960	13,667
Other[e]		25,400 [3]	24,100 [3]	5,000	5,000	--
Steel, crude	thousand metric tons	44,524	47,224	48,550	45,833	32,671
Semimanufactures	do.	37,771	41,174	41,999	39,805	29,041
Lead, metal, refined:						
Primary		118,778	113,760	110,934	113,200	104,900 [p]
Secondary		298,915	265,190	294,147 [r]	301,900	285,700 [p]
Total		417,693	378,950	405,081 [r]	415,100	390,600 [p]
Magnesium, metal including castings		27,282	30,556	30,791	29,818	20,015
Platinum-group metals, metal, refined	kilograms	104,725	116,350	137,645	121,597	110,000 [e]
Selenium, metal[e]		680	720	700	250 [r]	250
Silicon, metal[e]		29,349 [4]	35,500	35,254 [4]	35,000	20,000
Silver, metal, refined, including secondary		1,386	1,527	1,673	1,783	1,616
Tin, alloys		5,612	6,046	6,674	6,114	5,003
Zinc, metal:						
Primary		245,140	245,883	206,000 [r,e]	211,370	134,000 [e]
Secondary		89,751	96,683	89,000 [r,e]	80,910	19,000 [e]
Total		334,891	342,566	294,735 [r]	292,280	153,000 [e]

See footnotes at end of table.

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TABLE 1—Continued
GERMANY: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008	2009
INDUSTRIAL MINERALS						
Abrasives, manufactured		73,620	75,817	84,666	94,566	48,802
Aluminum salt slag, Al_2O_3 equivalent[e]	thousand metric tons	200	200	200	200	150
Barite, marketable (contained $BaSO_4$)		88,591	85,524	88,265	78,941	45,606
Boron compounds, manufactured, including boric acid and oxide		203,475	222,169	217,885	204,411	129,928
Bromine compounds, including oxide		274	431	1,612	1,680 r,e	960 e
Cement:						
Clinker, intended for market	thousand metric tons	24,378	24,921	26,992	25,366	23,232 p
Hydraulic	do.	31,009	33,630	33,382	33,581	30,441 p
Chalk, natural, including ground	do.	1,068	1,309	1,358	1,495	1,322
Clays, natural:						
Bentonite	do.	352	364	385	414	326
Ceramic and refractory clays[e]	do.	4,430	4,600	4,400	4,140	3,650
Of which, fire clay and chamotte	do.	176	194	252	267	250 e
Kaolin, marketable	do.	3,768	3,815	3,843	3,622 r	4,514
Other, unspecified	do.	185	509	467	182	193
Diatomite[e]		1,500	1,500	1,500	1,500	1,500
Feldspar		168,640	167,332	171,303	161,416	160,000
Fluorspar, acid-grade		35,364	53,009	54,359	48,519	49,962
Graphite, mine output		2,638	--	--	--	--
Gypsum and anhydrite:						
Natural	thousand metric tons	1,644	1,771	1,898	2,112	1,898
Byproduct of flue-gas desulfurization[e]	do.	7,640	7,490	7,100	6,900 r	7,100 e
Lime, quicklime, dead-burned dolomite	do.	6,823	7,119	7,218	7,313	5,830
Magnesium compounds, byproduct of potash mining	do.	1,290	1,203	1,357	1,418	811
Nitrogen, N content of ammonia	do.	2,789	2,718	2,746	2,819	2,363
Peat, natural	thousand cubic meters	283 r	248 r	97 r	135 r	135
Phosphoric acid, manufactured, P_2O_5 content		37,374	34,373	31,684	31,756	19,531
Pigments, iron oxide (including synthetic iron oxide)		231,585	242,264	240,310	251,412	209,172
Potash, K_2O content:						
Crude	thousand metric tons	4,434	4,385	4,406	4,046	2,208
Marketable	do.	3,664	3,625	3,637	3,280	1,825
Salt, NaCl content, marketable:						
Evaporated salt, including marine salt	do.	594	593	592	580	325
Industrial brines	do.	9,904	9,590	10,395	9,084	9,798
Rock salt and other brines	do.	8,834	9,663	7,819	6,169 r	8,816
Total	do.	19,332	19,846	18,806	15,833 r	18,939
Siliceous earth, marketable		50,399	53,282	51,980	52,003	42,602
Soda ash (Na_2CO_3), manufactured	thousand metric tons	1,533	1,515	1,510	1,567	1,200 e
Stone, sand and gravel:						
Stone, crude:						
Dimension, including partially worked	do.	212	219	200	207 r	380
Of which, dolomite and limestone	do.	75	75	63	68	80 e
Crushed, not including chalk	do.	150,747	162,168	152,790	154,032	155,430
Dolomite and limestone, not for cement manufacture	do.	20,600	22,400	22,800	21,300	19,000
Gravel, natural:						
Construction gravel	do.	62,498	68,706	65,370	63,962 r	59,100 e
Crude, including flint and pebbles	do.	12,753	13,301	12,928	12,631	10,442
Other gravel, including quartzite	do.	12,014	13,326	12,639	11,911	11,000 e
Sand, natural:						
Construction sand	do.	57,463	59,767	56,851	56,866 r	53,400 e
Silica sand, including glass sand and quartz sand	do.	7,681	7,703	8,382	8,186	6,453
Other, including from granite and pegmatite	do.	13,185	13,578	12,796	13,416	12,600 e
Total sand and gravel	do.	165,594	176,381	168,966	166,972 r	153,000 e
Strontium carbonate, manufactured[e]	do.	80	80	80	80	50

See footnotes at end of table.

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TABLE 1—Continued
GERMANY: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008	2009
INDUSTRIAL MINERALS—Continued						
Sulfur:						
Marketable	thousand metric tons	1,055	1,114	1,093	1,030	927
Byproduct:						
Metallurgy	do.	2,292 r	2,437 r	2,454 r	2,458 r	2,137
Natural gas and petroleum	do.	1,585	1,686	1,637	1,709	1,623
Total	do.	3,877 r	4,123 r	4,091 r	4,167 r	3,760
MINERAL FUELS AND RELATED MATERIALS						
Carbon black	do.	333	631	665	607	494
Coal:						
Anthracite and bituminous, marketable	do.	24,713	20,674	21,307	17,077	13,766
Lignite	do.	177,908	176,324	180,412	175,313 r	169,857
Coke:						
Of anthracite and bituminous coal	do.	8,397	8,372	8,432	8,246 r	6,771
Of lignite	do.	173	181	173	177	153
Fuel briquets:						
Of anthracite and bituminous coal	do.	92	96	89	--	--
Of lignite, including dust and dried	do.	1,490	1,662	1,328	1,631	1,959
Gas:						
Manufactured:						
Blast furnace[e]	million cubic meters	9	9	9	9	6
Coke oven	do.	974	958	970	969	718
Total[e]	do.	983	967	979	978	725
Natural:						
Gross	do.	19,762	19,667	17,966	16,547 r	15,554
Marketable	do.	18,666	18,443	16,884	15,377	14,380
Petroleum:[3]						
Crude	thousand 42-gallon barrels	26,200	25,800	25,300	22,400	20,500
Refinery products:						
Liquefied petroleum gas	do.	37,130	36,800	38,560	36,390	33,490
Distillate fuel oil	do.	390,000	380,000	380,000	370,000	360,000
Residual fuel oil	do.	74,500	76,200	75,300	67,500	55,600
Gasoline, including aviation	do.	210,000	210,000	200,000	200,000	200,000
Kerosene and jet fuel	do.	32,700	33,900	35,200	36,500	35,200
Naphtha	do.	94,000	90,000	86,000	87,000	75,000
Refinery gas	do.	50,600	49,100	48,300	47,800	44,500
Bitumen, bituminous mixtures, and other residues	do.	32,100	30,900	31,300	33,900	34,300
Lubricants and miscellaneous oils	do.	14,000	16,000	17,000	17,000	16,000
Petroleum coke	do.	10,900	11,000	10,600	11,500	10,900
Mineral jelly, waxes, and paraffins	do.	1,800	2,000	2,100	1,300	800
Other	do.	9,440	9,850	10,700	8,290	6,040
Total[e]	do.	957,000	946,000	935,000	917,000	872,000
Uranium concentrate, U_3O_8 content		111	77	48	--	--

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [p]Preliminary. [r]Revised. do. Ditto. -- Zero.
[1]Table includes data available through December 31, 2010.
[2]Iron ore is used domestically as an additive in cement and other construction materials but is of too low a grade to be used in the steel industry.
[3]Estimated from reported total marketed production of ferroalloys [Statistische Bundesamt, 2007, Fachserie 4, Reihe 3.1—Produzierendes Gewerbe, Produktion im Produzierenden Gewerbe, Jahr 2006: Wiesbaden, Germany, Statistische Bundesamt, April 30, p. 176].
[4]Reported figure.
[5]All figures were converted to barrels from those reported in metric tons according to data from Mineralölwirtschaftsverband e.V., 2010, Jahresbericht—Mineralöl-Zahlen, 2009: Berlin, Germany, Mineralölwirtschaftsverband e.V., May, p. 48 and 79, and reflect the significant digits of the conversion factors.

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TABLE 2
GERMANY: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Abrasives (silicon carbide)	ESK-SiC GmbH	Plant at Grefrath, Cologne	65
Alumina	Almatis GmbH (Dubai International Capital LLC)	Plant at Ludwigshafen	NA
Do.	Nabaltec AG	Plant at Schwandorf	120
Do.	Aluminium Oxid Stade GmbH (DADCO Alumina & Chemicals Ltd., 100%)	Plant at Stade	1,050
Do.	Martinswerk GmbH (Albemarle Corp., 100%)	Plant at Bergheim	350
Aluminum	Hydro Aluminium Deutschland GmbH (Norsk Hydro ASA, 100%)	Rheinwerk primary smelter at Neuss	235
Do.	Metallhüttenwerke Bruch GmbH	Secondary foundry alloy plant at Dortmund; secondary cast alloy plants at Asperg and Bad Saeckingen	110
Do.	Aleris Recycling (German Works) GmbH (Aleris International Inc., 100%)	Secondary smelters: Erftwerk at Grevenbroich, Innwerk at Toeging am Inn, and Neckarwerk at Deizisau	320
Do.	Trimet Aluminium AG	Primary smelter at Essen-Borbeck	175 e
Do.	Hamburger Aluminium-Werke GmbH (Trimet Aluminium AG, 100%)	Primary smelter at Hamburg	133
Do.	Aluminiumwerk Voerde Aluminium GmbH (Klesch & Company Ltd., 100%)	Primary smelter at Voerde, North Rhine-Westphalia	90
Aluminum, hot-rolled products	Aluminium Norf GmbH [Novelis Inc. (Hindalco Industries Ltd., 100%), 50%, and Hydro Aluminium Deutschland GmbH, 50%]	Lippenwerk at Luenen (secondary) and rolling mill at Neuss	1,500
Aluminum salt slag	Alsa Technologies GmbH (Agor AG, 100%)	Plants at Hannover, Luenen, and Toeging	380
Do.	K+S Entsorgung GmbH (K+S Aktiengesellschaft, 100%)	REKAL plant at Sigmundshall	100
Arsenic, metal metric tons	PPM Pure Metals GmbH[2] (Recylex S.A., 100%)	Plant at Langelsheim	5
Do. do.	Reinstmetalle Osterwieck GmbH (PPM Pure Metals GmbH,[2] 100%)	Plant at Osterwieck	NA
Barite	Sachtleben Bergbau GmbH	Clara Mine in the Black Forest and plant at Wolfach, and Dreislar Mine at Medebach-Dreislar	87
Do.	Deutsche Baryt-Industrie Dr. Rudolf Alberti GmbH & Co. KG (Sachtleben Bergbau GmbH, 75%, and other private, 25%)	Wolkenhügel Mine[3] in the Harz Mountains and plant at Bad Lauterberg	50
Bentonite	Süd-Chemie AG	Mining near Gammelsdorf, Bavaria, and plants at Moosburg, Duisburg, and Heufeld	500
Do.	S&B Industrial Minerals GmbH (S&B Industrial Minerals S.A., 100%)	Mining in region between Landshut and Mainburg, Bavaria	400
Do.	do.	Stollberg plant at Oberhausen	200 e
Do.	do.	Plant at Neuss	50
Do.	Kärlicher Ton- und Schamotte-Werke Mannheim & Co. KG (KTS)	Quarry at Muelheim-Kaerlich	50
Calcium carbonate, natural, ground	Alpha Calcit Fullstoff GmbH & Co. KG	Plant at Cologne	250
Do.	Omya GmbH (Omya AG, 100%)	Plants at Burgberg, Emden, Lagerdorf, and Sohlde, and another plant near Hamburg	2,250
Do.	Eduard Merkle GmbH & Co. KG	Mine at Ulm, Blaubeuren	NA
Calcium carbonate, natural, including chalk	Vereinigte Kreidewerke Dammann KG (OMYA AG, 100%)	Quarries and plants at Laegerdorf, on Ruegen Island, and at Soehlde	500
Cement	HeidelbergCement AG	Plant at Burglengenfeld; two plants at Ennigerloh; two plants at Geseke; plants at Koenigs Wusterhausen, Leimen, Paderborn, Mainz-Weisenau, and Schelklingen; the Lengfurt plant at Triefenstein; and plant at Wetzlar	9,500 e
Do.	Dyckerhoff AG (Buzzi Unicem SpA, 88.37%, and other private, 11.63%)	Plants at Deuna, Geseke, Goellheim, Lengerich, Neuss, Neuwied, and the Amöneburg plant at Wiesbaden	7,200

See footnotes at end of table.

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TABLE 2—Continued
GERMANY: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Cement—Continued	CEMEX Deutschland AG (CEMEX S.A. de C.V., 100%)	Two plants at Beckum; plants at Dortmund, Duisburg, Eisenhuettenstadt, and Ruedersdorf	6,000
Do.	SCHWENK Zement KG	Plants at Allmendingen, Bernburg, Heidenheim-Mergelstetten, and Karlstadt	5,000 e
Do.	Holcim (Deutschland) AG (Holcim Ltd., 88.9%, and other private, 11.1%)	HANSA plant at Bremen, plants at Laegerdorf and Rostock, and the Höver plant at Sehnde	3,600
Do.	Lafarge Zement GmbH (Lafarge S.A., 100%)	Plants at Kall-Soetenich, Karsdorf, and Walzbachtal	3,500
Do.	Holcim (Baden-Württemberg) AG (Holcim Ltd., 100%)	Plant at Dotternhausen	1,600
Do.	TEUTONIA Zementwerk AG (HeidelbergCement AG, 94.2%, and other private, 5.8%)	Plant at Hannover	900
Do.	Märker Zement GmbH	Plants at Harburg and Lauffen	NA
Clays, including ball, ceramic, kaolinitic, and refractory clays	Sibelco Deutschland GmbH (S.C.R.- Sibelco NV, 100%)	25 quarries and 8 plants, including 2 at Ransbach and the Kannenbäckerland plant in Hoehr-Grenzhausen, Westerwald region; also including quarries and plants of Kaolin- und Tonwerke Seilitz-Loethain, Saxony region	2,000
Do.	Stephan Schmidt KG	Tonbergbau Grube Anton open pit mine, Dornburg-Langendernbach, Müllenbach and Thewald Mines, Hoehr-Grenzhausen; Wiesa-Thonberg and Cunnersdorf quarries, Kamenz-Wiesa, Westerwald	1,600
Do.	Marx Bergbau GmbH & Co. KG (Stephan Schmidt KG, 100%)	Lämmersbach and Meudt Mines, Ruppach-Goldhausen quarry, Dornburg-Langendernbach, Westerwald	350
Do.	Goerg & Schneider GmbH & Co. KG	Quarry and main plant at Boden, others at Mogendorf, Goddert, Siershahn, Wirges/Staudt, and Kettenbach/Taunus, Westerwald region; others in Saxony and Eifel regions	NA
Do.	Mittelhessische Tonbergbau GmbH (Goerg & Schneider GmbH & Co. KG, 50%, and Stephan Schmidt KG, 50%)	Quarry and plant in the Giessen/Lahn region	100
Do.	Rohstoffgesellschaft GmbH Ponholz	Mine and chamotte plant at Maxhuette-Haidoff, and Aufofweiher Mine, Bavaria	150
Do.	Adolf Gottfried Tonwerke GmbH	Quarries and plant near Grossheirath, Coburg, Bavaria	100
Do.	Erbsloh Lohrheim GmbH (Erbsloh family, 100%)	Mine at Lohrheim, Rheinland-Pfalz	30
Coal, anthracite and bituminous	Deutsche Steinkohle AG (RAG Aktiengesellschaft, 100%)	Augusta Victoria/Blumenthal, Ost, Prosper-Haniel, and West Mines, Ruhr region, North Rhine-Westphalia	14,500 e
Do.	do.	Saar Mine, Saar Basin, Saarland	2,000 e
Do.	do.	Ibbenbüren Mine, Steinfurt District, North Rhine-Westphalia	2,100
Coke	Deutsche Steinkohle AG (RAG Aktiengesellschaft, 100%)	Pitside coking plant at the Prosper-Haniel Mine	2,000 e
Do.	ThyssenKrupp Steel AG	Schwelgern plant at Duisburg	2,100
Do.	Hüttenwerke Krupp Mannesmann GmbH (ThyssenKrupp Steel AG, 50%; Vallourec & Mannesmann Tubes SA, 20%; Mannesmannröhren-Werke GmbH, 30%)	Plant at Duisberg-Huckingen steel complex	1,100
Copper, refined	Norddeutsche Affinerie AG (Salzgitter AG, 25%; other private investors, 30%; institutional investors, 45%)	Primary smelter and refinery and secondary plant at Hamburg	500 e
Do.	Hüttenwerke Kayser AG (Norddeutsche Affinerie AG, 100%)	Secondary plant and refinery at Luenen	210 e

See footnotes at end of table.

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TABLE 2—Continued
GERMANY: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Dolomite	Rheinkalk Hagen-Halden GmbH & Co KG (Lhoist NV, 100%)	Steinbruch-Donnerkuhle quarry and Hönnetal plant at Menden, and plant at Hagen-Halden	7,500
Dolomite and lime	Geomin Erzgebirgische Kalkwerke GmbH	Underground mines at Hermsdorf and Lengenfeld	NA
Feldspar	Saarfeldspatwerke H. Huppert GmbH & Co. KG	Mine at Oberthal, Gudesweiler, Saarland	60
Do.	Gottfried Feldspat GmbH	Mine at Freihung-Thansuss, Weiden, Bavaria	15
Ferrochrome	Elektrowerk Weisweiler GmbH (Kermas Ltd., 100%)	Plant at Eschweiler-Weisweiler, near Aachen	30
Fluorspar	Sachtleben Bergbau GmbH	Clara Mine in the Black Forest and plant at Wolfach	55 e
Gallium metric tons	Geo Gallium S.A. (Mining & Chemical Products Ltd., 50%, and Recapture Metals Inc., 50%)	Ingal plant at Stade	35
Do. do.	PPM Pure Metals GmbH[2] (Recylex S.A., 100%)	Plant at Langelsheim	NA
Graphite, manufactured	Graphit Kropfmühl AG	Plant at Kropfmuehl, Passau	20
Do.	do.	Plants at Bad Godesberg and Wedel, Holstein	8
Gypsum	VG-ORTH GmbH & Co. KG	Mine and plant at Stadtoldendorf, and plants at Osterode, Spremberg, and Witzenhausen	150
Do.	Gyproc GmbH (Lafarge S.A., 100%)	Mines and plant in Lower Saxony	110
Iron, blast furnace	ThyssenKrupp Steel AG	Two blast furnace plants at Hamborn and Schelgern	12,000
Iron, direct reduced	ArcelorMittal Hamburg GmbH (ArcelorMittal, 100%)	Plant at Hamburg	600 e
Iron oxide, pigments	Lanxess AG	Plant at Krefeld-Uerdingen	300
Kaolin, feldspar, and quartz	Amberger Kaolinwerke GmbH—Eduard Kick GmbH & Co. KG (Quarzwerke GmbH, 100%)	Mines at Caminau, Hirschau, Kemmlitz, and Schnaittenbach, Bavaria	350
Do.	Gebrüder Dorfner GmbH & Co Kaolin - und Kristallquartzsand Werk KG	Mine near Hirschau, Bavaria	NA
Lead, metal	Weser Metall GmbH (Recylex S.A., 100%)	Primary and secondary smelter and refinery at Nordenhan	145
Do.	Berzelius Metall GmbH [Eco-Bat Technologies Ltd. (Quexco Inc., 100%), 100%]	Secondary smelters at Braubach am Rhein and Freiberg/Sachsen	200
Do.	do.	Primary smelter at Stolberg	150
Do.	Muldenhütten Recycling- und Umwelttechnik GmbH	Secondary smelter at Freiburg, Saxony	55
Do.	Norddeutsche Affinerie AG	Refinery at Hamburg	50
Lignite	RWE Power AG (RWE Aktiengesellschaft, 100%)	Open pit mines in Rhenish mining area: Bergheim, Garzweiler, Inden, and Hambach	105,000
Do.	Vattenfall Europe Mining AG	Jänschwalde-Cottbus-Nord, Nochten, and Welzow-Süd Mines, Lausatian mining area	60,000
Do.	Mitteldeutsche Braunkohlengesellschaft AG	Profen and Vereinigtes Schleenhain mines	25,000
Limestone	Harz-Kalk GmbH	Quarry at Ruebeland	2,000 e
Do.	Kalkwerk Bad Kösen GmbH	Quarry at Bad Koesen	2,000 e
Do.	Fels-Werke GmbH	Quarry at Kaltes Tal	2,000 e
Do.	Schäfer Kalk GmbH & Co KG	Plants at Hahnstaetten, Steeden, Stromberg, and Grevenbrueck	3,000
Do.	Rheinkalk GmbH & Co KG (Lhoist NV, 100%)	Flandersbach quarry and plant at Wuelfrath	7,500
Magnesium, metal, secondary	Norsk Hydro Magnesiumgesellschaft GmbH (Norsk Hydro ASA, 100%)	Plant at Bottrop	26
Do.	Aleris Recycling (German Works) GmbH (Aleris International Inc., 100%)	Plant at Toeging am Inn	15
Do.	do.	Plant at Deizisau	50
Natural gas million cubic meters	Mobil Erdgas-Erdöl GmbH (Exxon Mobil Corp., 100%), including any fields owned or operated by BEB Erdgas und Erdöl GmbH (Exxon Mobil Corp., 50%, and Royal Dutch Shell plc, 50%)	Goldenstedt, Hemmelte, Klosterseelte, Söhlingen, and other fields in Lower Saxony	14,000 e
Do. do.	RWE-Dea AG (RWE Power AG, 100%)	Bötersen, Hemsbünde, Völkersen, and smaller fields in Lower Saxony; and Inzenham-West Field, Bavaria	3,000 e
Do. do.	Gaz de France Produktion Exploration Deutschland GmbH (Gaz de France S.A., 100%)	Salzwedel Field, Saxony-Anhalt; Schneeren and smaller fields in Lower Saxony	1,500 e

See footnotes at end of table.

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TABLE 2—Continued
GERMANY: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Natural gas—Continued	million cubic meters	Wintershall Holding AG (BASF AG, 100%)	A6/B4 blocks offshore of Schleswig Holstein; and smaller fields in Lower Saxony	1,200 e
Do.	do.	EEG-Erdgas Erdöl GmbH (Gaz de France S.A., 100%)	Muehlhausen and other fields in Thüringen	50 e
Petroleum:				
Crude	thousand 42-gallon barrels	Wintershall Holding AG (BASF AG, 100%), 50%, and RWE-Dea AG (RWE Power AG, 100%), 50%	Mittelplate-Dieksand field, in tidal flats of the North Sea, offshore of Schleswig-Holstein	15,500
Do.	do.	Wintershall Holding AG (BASF AG, 100%)	A6/B4 blocks offshore of Schleswig Holstein; Aitingen field, Bavaria; Emlichheim field, Lower Saxony; and smaller fields in Lower Saxony and Rheinland-Pfalz	2,000 e
Do.	do.	Gaz de France Produktion Exploration Deutschland GmbH (Gaz de France S.A., 100%)	Bramberge, Ruehlertwist, Scheerhorn, and Ringe fields in Lower Saxony; and smaller fields in the States of Bavaria, Hamburg, Lower Saxony, and Mecklenburg-Western Pomerania	3,500 e
Do.	do.	Mobil Erdgas-Erdöl GmbH (Exxon Mobil Corp., 100%)	Barenburg, Ruehme, and Lueben fields, Lower Saxony; and smaller fields in the States of Lower Saxony and Rheinland-Pfalz	1,800 e
Do.	do.	BEB Erdgas und Erdöl GmbH (Exxon Mobil Corp., 50%, and Royal Dutch Shell plc, 50%)	Georgsdorf, Meppen, and Ruehlermoor fields, west of the Ems river (Emsland), Lower Saxony	3,000 e
Refined	do.	Deutsche Shell AG	Refineries at Godorf, Hamburg, and Grasbrook	256,000 e
Do.	do.	Esso Deutschland GmbH (ExxonMobil Central Europe Holding GmbH, 100%)	Refineries at Karlsruhe and Ingolstadt	245,000 e
Do.	do.	Ruhr Oel GmbH (Petróleos de Venezuela S.A., 50%, and BP Gelsenkirchen GmbH, 50%)	Refinery at Gelsenkirchen	215,500 e
Do.	do.	BAYERNOIL Raffineriegesellschaft mbH (OMV AG, 45%; Ruhr Oel GmbH, 25%; AGIP Deutschland GmbH, 20%; Deutsche BP AG, 10%)	Refinery at Neustadt-Donau	145,000 e
Potash, K_2O content		K+S Kali GmbH (K+S Aktiengesellschaft, 100%)	Mines at Hattorf, Neuhof-Ellers, Niedersachen-Riedel, Sigmundshall, Unterbreizbach, Wintershall, and Zielitz	6,000
Salt (evaporated and rock)		esco - european salt company GmbH & Co. KG [K+S Salz GmbH (K+S Aktiengesellschaft, 100%)]	Bernburg Mine and evaporated salt works; Borth Mine and evaporated salt works near Wesel; and the Braunschweig-Lüneburg Mine near Helmstedt	5,300 e
Do.		Wacker Chemie AG	Stetten rock salt mine near Haigerloch	500
Do.		Südsalz GmbH (Südwestdeutsche Salzwerke AG, 90%, and Vereinigte Schweizerische Rheinsalinen AG, 10%)	Rock salt mine at Berchtesgaden and evaporated salt works at Bad Reichenhall, Bavaria; and mine at Heilbronn and evaporated salt works at Bad Friedrichshall-Kochendorf, Heilbronn district, State of Baden-Württemburg	5,000
Do.		Saline Luisenhall GmbH	Evaporated salt works at Göttingen	NA
Selenium, metal	metric tons	Retorte GmbH (Norddeutsche Affinerie AG, 100%)	Plant at Röthenbach	2,500
Silica sand (industrial sand)		Quarzwerke GmbH	Mines and plants at Frechen, Gambach, Haltern, Hohenbocka, and Weferlingen	4,500 e
Do.		Amberger Kaolinwerke GmbH—Eduard Kick GmbH & Co. KG (Quarzwerke GmbH, 100%)	Mines and plants at Hirschau and Schnaittenbach	850
Siliceous earth, silica		Hoffmann Mineral and Co. KG	Mine and plant near Neuburg	55
Silicon, metal	metric tons	RW Silicium GmbH (Graphit Kropfmühl AG, 100%)	Four electric arc furnaces in plant at Pocking	27,500
Soda ash		Solvay S.A.	Plant at Rheinberg, Germany	NA
Steel, crude		ThyssenKrupp Steel AG (ThyssenKrupp AG, 100%)	Bruckhausen and Beeckerwerth plants, near Duisburg	12,000
Do.		Salzgitter AG	Plants at Peine and Salzgitter	6,400 e
Do.		Hüttenwerke Krupp Mannesmann GmbH (ThyssenKrupp Steel AG, 50%; Vallourec & Mannesmann Tubes SA, 20%; Mannesmannröhren-Werke GmbH, 30%)	Plant at Duisberg-Huckingen	5,600

See footnotes at end of table.

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TABLE 2—Continued
GERMANY: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Steel, crude—Continued	ArcelorMittal Bremen GmbH (ArcelorMittal, 99.88%, and other private, 0.12%)	Plant at Bremen	4,000
Do.	Saarstahl AG (Struktur-Holding-Stahl GmbH & Co KG, 74.9%, and Dillinger Hüttenwerke AG, 25.1%)	Plants at Burbach, Neunkirchen, and Voelklingen	3,000
Do.	AG der Dillinger Hüttenwerke (Saarstahl AG, 33.75%; ArcelorMittal, 30.08%; Struktur-Holding-Stahl GmbH & Co KG, 26.17%; Dillinger Hütte und Saarstahl mbH, 10%; other, 4.72%)	Plant at Dillingen	2,800
Do.	ArcelorMittal Eisenhüttenstadt GmbH (ArcelorMittal, 100%)	Plant at Eisenhuettenstadt	2,700
Do.	Badische Stahlwerke GmbH	Plant at Kehl	2,300 e
Do.	Brandenburger Elektrostahlwerk GmbH (RIVA FIRE S.p.A, 100%)	Plant at Brandenburg	1,700 e
Do.	ThyssenKrupp Nirosta (ThyssenKrupp Steel AG, 100%)	Plants at Bochum and Krefeld	1,600 e
Do.	ArcelorMittal Ruhrort GmbH (ArcelorMittal, 100%)	Plant at Duisburg	1,500 e
Do.	Georgsmarienhütte GmbH	Plants at Bous, Georgsmarienhuette, and Groeditz	1,300 e
Do.	Stahlwerk Thüringen GmbH (Alfonso Gallardo S.A., 100%)	Plant at Unterwellenborn	1,100 e
Do.	Deutsche Edelstahlwerke GmbH	Plants at Siegen and Witten	1,100 e
Do.	Lech-Stahlwerke GmbH (Max Aicher GmbH & Co. KG, 100%)	Plant at Herbertshofen	1,100 e
Do.	ArcelorMittal Hamburg GmbH (ArcelorMittal, 100%)	Plant at Hamburg	1,100 e
Do.	Hennigsdorfer Elektrostahlwerk GmbH (RIVA FIRE S.p.A, 100%)	Plant at Hennigsdorf	1,000 e
Do.	Elbe-Stahlwerke Feralpi GmbH (Feralpi Siderurgica S.p.A., 100%)	Plant at Riesa	950 e
Strontium carbonate	Solvay & CPC Barium Strontium GmbH & Co. KG (Solvay S.A., 75%, and Chemical Products Corp., 25%)	Plant at Bad Hoenningen, near Hannover	95
Sulfur	Norddeutsche Erdgas-Aufbereitungs GmbH NEAG [BEB Erdgas und Erdöl GmbH (ExxonMobil Production Deutschland GmbH, 50%, and Royal Dutch Shell plc, 50%), 100%]	Natural gas desulfurization plants at Grossenkneten and Voigtei (near Nienburg-Weser), Lower Saxony	600
Zeolites	Hans G. Hauri Mineralstoffwerk GmbH	Mine and plant at Boetzingen, near Freiburg	NA
Zinc, metal	Metaleurop Zinkbetrieb GmbH & Co. KG (Xstrata plc, 100%)	Nordenham Smelter, near Bremerhaven	160
Do.	Ruhr-Zink GmbH (GEA Group AG, 100%)	Refinery at Datteln[4]	140
Zinc, oxides	Harz Metall GmbH (Recylex S.A., 100%)	Waëlz rotary kilns at Oker-Goslar	80 e
Do.	Norzinco GmbH (Recylex S.A., 100%)	Secondary plant at Oker-Goslar	35 e

eEstimated; estimated data are rounded to no more than three significant digits. NA Not available.
[1]Table includes data available through December 31, 2010.
[2]In addition to producing arsenic as a byproduct of chemical manufacturing and gallium as a byproduct of aluminum production, PPM Pure Metals GmbH produces small quantities of germanium as a byproduct of processing imported ores and concentrates and small quantities of indium and tellurium as byproducts of zinc metal production by PPM's parent company, Recylex S.A.
[3]Closed in 2007.
[4]Closed at the end of 2008, and approximately 40% of total production of zinc metal at this refinery was from secondary materials.

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TABLE 3
GERMANY: EXPORTS OF SELECTED MINERAL COMMODITIES IN 2008[1]

(Metric tons unless otherwise specified)

Commodity		Total	Destinations[e] United States	Other (principal)[2]
METALS				
Aluminum:				
Bauxite, ore and concentrate		33,636	--	Netherlands 8,070; France 6,760; Czech Republic 2,420.
Oxides		305,510	--	France 62,900; Poland 33,000; Norway 29,900.
Hydroxides		634,632	105,000	Netherlands 114,000; United Kingdom 74,900; Sweden 62,200.
Ash and residues containing aluminum		15,167	--	Norway 5,980; France 3,340; Netherlands 1,930.
Metal:				
Primary, not alloyed		75,386	--	France 19,600; United Kingdom 15,900; Netherlands 10,600.
Primary, alloys, all forms		141,472	--	Poland 34,800; Austria 31,700; Belgium 21,500.
Secondary		218,155	--	France 61,300; Netherlands 24,700; Italy 23,100.
Scrap		702,737	--	Italy 159,000; Netherlands 111,000; Austria 89,200.
Antimony:				
Metal, including alloys, all forms		33	--	Slovakia 17; Sweden 7; Greece 6.
Oxides		932	--	Czech Republic 121; Norway 100; Belgium 97.
Arsenic, metal, including alloys, all forms		41	3	Japan 19; China 15; Republic of Korea 3.
Bismuth, metal, crude, including scrap		251	--	France 99; Czech Republic 82; United Kingdom 13.
Chromium:				
Ore and concentrate		23,563	--	Czech Republic 4,360; United Kingdom 3,490; Slovakia 3,160.
Metal:				
Crude, including powder		1,363	248	Austria 166; Canada 114; Czech Republic 87.
Scrap		3,949	--	Sweden 2,250; Austria 691; Netherlands 600.
Cobalt:				
Ore and concentrate		145	--	Belgium 71; Finland 30; India 26.
Oxides and hydroxides		158	13	France 29; Spain 20; Hong Kong 19.
Metal, including alloys, all forms		418	--	United Kingdom 68; France 61; Japan 41.
Scrap		550	115	United Kingdom 301; Canada 62; Austria 32.
Copper:				
Ore and concentrate		48,234	--	Sweden 46,500.
Ash and residue containing copper		15,193	--	Belgium 8,660; Canada 4,850; Netherlands 820.
Matte and speiss, including cement copper		2	--	Liechtenstein 1; Malaysia < 1; Hungary < 1.
Metal:				
Unrefined		182	--	Czech Republic 180.
Refined, not alloyed		124,979	--	China 25,900; France 24,000; Italy 13,900.
Alloys, all forms		16,485	--	Sweden 2,340; Italy 2,080; Switzerland 1,730.
Scrap		478,640	--	China 196,000; Netherlands 83,800; Austria 43,600.
Gallium, indium, and thallium, metal, including scrap		27	13	United Kingdom 12.
Germanium:				
Oxides		266	40	Hungary 94; Austria 45; Italy 22.
Metal, all forms		5		China 4; Russia 1.
Gold:				
Metal, including alloys, all forms	kilograms	172	80	Austria 58; Spain 16.
Waste and sweepings	do.	5,327	2,060	Switzerland 2,920.
Iron and steel:				
Ore and concentrate		34,496	--	Netherlands 15,600; China 4,210; Finland 3,730.
Pyrite, roasted		12,700	--	Switzerland, 100%.
Ash and residue containing iron	thousand metric tons	1,675	--	France 435; Netherlands 427; United Kingdom 325.
Metal:				
Pig iron, cast iron, related materials		153,890	--	Italy 34,900; France 20,900; Czech Republic 27,100.
Scrap	thousand metric tons	8,953	--	France 1,780; Netherlands 1,580; Italy 1,450.
Sponge iron, powder		95,836	--	France 74,000.
Ferroalloys:				
Ferrochromium		36,856	4,460	Belgium 7,040; Austria 6,780; France 4,350.
Ferromanganese		11,803	--	Poland 2,880; Austria 2,460; Switzerland 1,880.
Ferromolybdenum		3,858	--	Italy 995; Czech Republic 849; Sweden 448.
Ferronickel		1,036	--	Sweden 400; France 316; Belgium 130.

See footnotes at end of table.

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TABLE 3—Continued
GERMANY: EXPORTS OF SELECTED MINERAL COMMODITIES IN 2008[1]

(Metric tons unless otherwise specified)

Commodity		Total	Destinations[e] United States	Other (principal)[2]
METALS—Continued				
Iron and steel, metal—Continued:				
Ferroalloys—Continued:				
Ferroniobium		1,056	62	Belgium 231; Italy 170; Sweden 132.
Ferrosilicomagnesium		6,342	--	Italy 3,370; Czech Republic 571; Belgium 355.
Ferrosilicomanganese		10,354	--	Belgium 3,300; France 2,060; Spain 1,490.
Ferrosilicon		63,858	--	Austria 11,800; Belgium 9,450; France 7,540.
Ferrotitanium		4,237	--	France 852; Italy 703; Sweden 640.
Ferrotungsten		460	--	Austria 222; Italy 78; France 39.
Ferrovanadium		413	--	Italy 139; Belgium 40; Czech Republic 34.
Other ferroalloys		45,449	--	France 10,300; Italy 4,860; Japan 3,500.
Steel, crude		3,245	1,130	Iceland 581; Australia 227; United Arab Emirates 201.
Lead:				
Ash, residues and slimes containing lead		4,622	--	Belgium 2,580; China 2,000.
Lead containing antimony		6,355	--	France 2,210; Austria 1,890; Czech Republic 1,240.
Metal:				
Alloys, all forms		37,365	--	Luxembourg 12,900; France 9,710; Belgium 5,010.
Refined		132,892	--	France 31,400; Italy 21,800; Czech Republic 20,100.
Unrefined		517	--	Switzerland 504.
Scrap		13,133	--	Netherlands 5,630; Belgium 1,510; Czech Republic 1,460.
Lithium carbonate		2,290	--	France 621; Turkey 405; Austria 197.
Magnesium, metal, including alloys:				
Scrap		12,406	--	Czech Republic 4,640; Austria 4,260; Netherlands 806.
Unwrought		19,136	1,400	France 3,100; Spain 2,830; Austria 1,950.
Manganese, ore and concentrate		3,321	--	Belgium 2,430; Turkey 252.
Mercury		111	31	Spain 36; Libya 16; Israel 6.
Molybdenum:				
Ore and concentrate		3,574	--	Belgium 1,250; Italy 640; China 497.
Metal, scrap		2,693	--	Unspecified, 100%.
Nickel:				
Ore and concentrate		316	--	Finland 264; Canada 28; Sweden 24.
Matte, speiss, related materials		20,202	--	Canada 19,800.
Oxides and hydroxides		25	4	Austria 8; Switzerland 4; Italy 3.
Ash and residue containing nickel		725	--	Sweden 534; Netherlands 165.
Metal, including alloys:				
Alloys, all forms		8,988	791	Austria 6,740; United Kingdom 989.
Unalloyed		5,200	--	Austria 1,870; Czech Republic 582; France 489.
Scrap		5,647	1,390	Netherlands 695; France 649.
Niobium (columbium), metal, powder, containing both niobium and rhenium		< 1	--	France, 50%; Unspecified 50%.
Platinum-group metals:				
Metal, including alloys, all forms:				
Platinum	kilograms	24,763	2,550	Switzerland 10,600; United Kingdom 2,400; Japan 1,910.
Palladium	do.	24,037	2,280	Belgium 7,500; China 4,250; Brazil 2,860.
Rhodium	do.	3,130	1,070	Japan 635; China 444; Brazil 307.
Iridium, osmium and ruthenium	do.	24,518	20,100	Belgium 1,990.
Waste, sweepings and scrap		3,239	2,190	Belgium 379; United Kingdom 272; Netherlands 236.
Rare-earth metals, including alloys:				
Compounds, all forms		189	13	France 35; Italy 33; Republic of Korea 21.
Metal		3	--	Turkey, 100%.
Selenium, metal		367	--	Philippines 58; Canada 56; Mexico 41.
Silver:				
Ore and concentrate		3	--	Ecuador, 100%.
Metal		1,516	--	Unspecified 791; Belgium 165; Netherlands 136.
Powder	kilograms	66,756	10,000	Greece 18,900; France 10,900; Netherlands 5,810.

See footnotes at end of table.

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TABLE 3—Continued
GERMANY: EXPORTS OF SELECTED MINERAL COMMODITIES IN 2008[1]

(Metric tons unless otherwise specified)

Commodity		Total	Destinations[e]	
			United States	Other (principal)[2]
METALS—Continued				
Tantalum, metal:				
Powder	do.	214,573	--	Unspecified, 100%.
Waste and scrap	do.	57,290	--	Unspecified, 100%.
Tin:				
Ore and concentrate		< 1	--	Norway, 50%; Thailand, 50%.
Ash and residue containing tin		257	--	Belgium 228; Netherlands 29.
Metal:				
Alloys, all forms		1,531	--	Republic of Korea 421; Italy 217; Poland 139.
Crude		1,612	--	Switzerland 440; Belgium 300; France 153.
Waste and scrap		1,649	--	France 821; Netherlands 381; Belgium 376.
Titanium:				
Metal:				
Powder		2,370	922	Italy 246; Canada 173; Taiwan 147.
Waste and scrap		4,742	1,360	United Kingdom 2,650.
Ore and concentrate		3,322	2,980	
Oxide		51,538	3,500	Austria 4,900; China 4,330; Taiwan 4,020.
Titaniferous slag		69	--	Netherlands, 100%.
Tungsten:				
Ore and concentrate		206	--	China 131; Tunisia 42; Republic of Korea 21.
Wolframite		2,275	--	Unspecified, 100%.
Metal, including alloys:				
Metal, crude		752	--	Unspecified, 100%.
Scrap		3,738	1,640	France 583; United Kingdom 336; Austria 258.
Vanadium:				
Metal, including scrap		450	117	United Kingdom 107; Russia 62; Japan 55.
Ore and concentrate		1,405	--	Unspecified, 100%.
Oxides and hydroxides		1,173	--	Unspecified, 100%.
Zinc:				
Ore and concentrate		1,835	--	United Kingdom 1,810.
Ash and residue containing zinc		44,312	--	Belgium 36,800.
Matte and related materials		2,904	--	Luxembourg 1,820; Austria 799; Belgium 186.
Metal:				
Alloys, all forms		89,737	--	Belgium 62,000; Netherlands 9,060; United Kingdom 7,360.
Unalloyed		70,724	--	France 23,100; Austria 14,100; Belgium 6,080.
Powder and dust		5,446	--	Luxembourg 958; Switzerland 752; China 713.
Scrap		51,800	--	China 14,700; Belgium 13,900; Italy 5,080.
Zirconium:				
Ore and concentrate		2,799	--	Russia 1,020; Austria 521; Belgium 218.
Metal, including alloys		38	13	Japan 7; Canada 3; Czech Republic 2.
Scrap		31	--	Spain 14; Belgium 13; United Kingdom 3.
INDUSTRIAL MINERALS				
Abrasives, natural:				
Corundum, emery, garnet, etc.		12,383	--	Sweden 3,570; Switzerland 1,980; Norway 1,800.
Pumice		228,671	--	Netherlands 167,000; Luxembourg 43,900.
Asbestos, crude		< 1	--	Switzerland, 100%.
Barite		38,111	--	Unspecified, 100%.
Borates, natural, including calcined		200	--	Belgium 141; Oman 20; Switzerland 18.
Cement	thousand metric tons	8,313	--	Netherlands 2,770; Belgium 1,060; Poland 790.
Chalk, natural		204,185	--	Netherlands 61,900; Poland 34,300; Finland 28,200.
Clays, crude:				
Bentonite		67,107	--	Netherlands 13,000; Austria 10,900; France 10,100.
Kaolin		498,163	--	Austria 10,700; Netherlands 10,200; Italy 87,200.
Other, unspecified	thousand metric tons	2,593	--	Italy 1,020; Netherlands 767; Belgium 360.

See footnotes at end of table.

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TABLE 3—Continued
GERMANY: EXPORTS OF SELECTED MINERAL COMMODITIES IN 2008[1]

(Metric tons unless otherwise specified)

Commodity		Total	Destinations[e]	
			United States	Other (principal)[2]
INDUSTRIAL MINERALS—Continued				
Diamond, natural:				
Gem, not set or strung	carats	153,893	18,600	Hong Kong 32,300; Thailand 25,400; India 10,800.
Industrial stones	do.	11,966	--	Belgium 6,090; Switzerland 3,430; Austria 909.
Dust and powder	kilograms	682	--	Syria 182; India 141; Switzerland 93.
Diatomite and other infusorial earth		7,189	--	Netherlands 1,020; Austria 963; Russia 956.
Feldspar		121,776	--	France 50,700; Italy 15,300; Czech Republic 10,700.
Fluorspar:				
Acid-grade		35,295	--	Czech Republic 16,000; France 3,990; Poland 3,920.
Metallurgical-grade		15,043	--	Czech Republic 4,320; France 4,150; Austria 2,150.
Graphite, natural		18,950	--	Czech Republic 4,960; France 4,000; Austria 1,550.
Gypsum and anhydrite, natural	thousand metric tons	2,223	--	Poland 431; Belgium 407; Netherlands 269.
Kyanite and related materials:				
Andalusite, kyanite, sillimanite		5,431	--	Hungary 1,160; Czech Republic 983; Switzerland 945.
Mullite		12,800	3,100	Italy 2,040; United Kingdom 1,420; Spain 1,320.
Lime, hydrated	thousand metric tons	1,227	--	Netherlands 724; France 128; Belgium 125.
Magnesium compounds:				
Magnesite, natural, including burned		72,706	--	France 25,500; Austria 12,400; Slovakia 7,710.
Epsomite		722,620	--	Malaysia 164,000; France 156,000; Indonesia 124,000.
Meerschaum, sepiolite		966		China 490; Austria 433.
Mica, natural, including splittings and waste		4,711	--	Brazil 1,320; Italy 551; Switzerland 349.
Peat, natural	thousand metric tons	2,149	--	Netherlands 1,000; Italy 211; France 211.
Phosphates:				
Crude		< 1	--	Czech Republic, 100%.
Milled		314	--	Kazakhstan 176; Austria 83; Switzerland 46.
Precious and semiprecious gemstones, natural (other than diamond):	kilograms	345,175	21,100	Hong Kong 174,000; India 25,900.
Pyrite, unroasted		485	--	Czech Republic 112; Saudi Arabia 80; Italy 75.
Salt and brine	thousand metric tons	2,783	--	Belgium 863; Sweden 323; Czech Republic 273.
Stone, sand and gravel:				
Basalt, lava rocks, and so forth		286,983	--	Netherlands 281,000.
Crushed rock, macadam		82,103	--	Switzerland 73,300; France 8,460.
Dimension stone:				
Dolomite and limestone		901,442	--	Luxembourg 585,000; Belgium 79,300; Netherlands 64,000.
Granite		78,154	--	Switzerland 67,200.
Marble, travertine, and so forth		194,778	--	Switzerland 69,000; Netherlands 34,100; China 20,300.
Limestone for cement		219,757	--	Luxembourg 141,000; Netherlands 35,800; France 18,500.
Quartz and quartzite		396,733	--	France 248,000; Netherlands 71,800; Luxembourg 48,000.
Sand, natural	thousand metric tons	10,901	--	Netherlands 7,890; Belgium 1,570.
Sandstone		2,584	--	Netherlands 1,080; Austria 659; Australia 339.
Schist and shale		18,824	--	Belgium 8,210; Netherlands 5,970; Denmark 3,900.
Unworked stone, natural	thousand metric tons	13,256	--	Netherlands 9,240; Belgium 1,210; Switzerland 1,110.
Other natural stone, unspecified	do.	7,670	--	Netherlands 3,370; Poland 1,690; Belgium 629.
Sulfur		654,808	--	Morocco 105,000; Poland 96,300; Namibia 70,700.
Talc, steatite and soapstone, natural		6,380	--	Slovenia 1,190; Denmark 785; Netherlands 772.
Vermiculite and perlite, natural		4,338	--	Austria 694; Poland 638; Belgium 607.
MINERAL FUELS AND RELATED MATERIALS				
Asphalt and bitumen, natural		162,084	--	Austria 70,300; Luxembourg 33,600; Belgium 13,500.
Coal:				
Anthracite		16,575	--	Spain 4,340; Netherlands 3,270; Algeria 3,100.
Lignite		792,133	--	Belgium 234,000; France 148,000; Czech Republic 105,000.
Other bituminous, including briquets		505,811	--	France 327,000; Belgium 112,000.
Coke:				
Of anthracite and bituminous coal		165,052	--	United Kingdom 50,000; Netherlands 44,200; France 27,900.
Of lignite		202,800	--	Belgium 89,400; France 42,400; Austria 26,400.

See footnotes at end of table.

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TABLE 3—Continued
GERMANY: EXPORTS OF SELECTED MINERAL COMMODITIES IN 2008[1]

(Metric tons unless otherwise specified)

Commodity		Total	Destinations[e] United States	Other (principal)[2]
MINERAL FUELS AND RELATED MATERIALS—Continued				
Gas, natural, gaseous	thousand metric tons	9,769	--	Unspecified, 100%.
Petroleum, crude	do.	40	--	United Kingdom 36; Austria 4.
Uranium, natural:				
Crude, U content	kilograms	4,601	--	Sweden 4,360.
Enriched, fissile isotopes	do.	16,508	4,330	Belgium 5,560; Republic of Korea 2,280; Sweden 1,570.

[e]Estimated; estimated tonnages are rounded to no more than three significant digits; may not add to totals shown. -- Less than 5%.
[1]Source: Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, Table 1—Rohstoffsituation, 2008: Hannover, Germany, October.
[2]Destination country was estimated to have accounted for at least 5% of Germany's total exports of the mineral commodity.

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TABLE 4
GERMANY: IMPORTS OF SELECTED MINERAL COMMODITIES IN 2008[1]

(Metric tons unless otherwise specified)

Commodity		Total	Sources[e] United States	Other (principal)[2]
METALS				
Aluminum:				
Bauxite, ore and concentrate	thousand metric tons	2,995	183	Guinea 1,980; Ghana 303; Brazil 249.
Oxides	do.	1,018	--	Jamaica 434; Ireland 229; Netherlands 118.
Hydroxides		241,735	--	Ireland 81,700; Spain 67,400; France 42,800.
Ash and residue containing aluminum		140,471	--	France 50,100; Netherlands 22,100; Switzerland 19,100.
Metal:				
Primary, not alloyed		693,074	--	Russia 222,000; Iceland 142,000; Netherlands 110,000.
Primary, alloys, all forms		835,984	--	Netherlands 232,000; Norway 214,000; France 93,600.
Secondary		534,196	--	United Kingdom 240,000; Austria 47,000; Italy 39,500.
Scrap		543,837	--	Netherlands 113,000; France 54,900; United Kingdom 52,800.
Antimony:				
Metal, including alloys, all forms		697	--	China 374; Vietnam 217; United Kingdom 43.
Ore and concentrate		61	--	Belgium 42; India 14; Netherlands 5.
Oxides		8,672	--	China 3,620; France 2,350; Belgium 2,000.
Scrap		3	--	China, 100%.
Arsenic, metal, including alloys, all forms		< 1	25%	Japan, 25%; Switzerland, 25%; China, 25%.
Bismuth, metal, crude, including scrap		1,188	--	Belgium 434; United Kingdom 253; China 229.
Chromium:				
Ore and concentrate		175,277	--	South Africa 122,000; Netherlands 26,100; Turkey 23,500.
Metal:				
Crude, including powder		5,408	--	Russia 1,670; United Kingdom 1,300; France 1,060.
Scrap		1,465	--	Netherlands 621; Poland 415; France 388.
Cobalt:				
Ore and concentrate	thousand metric tons	15	--	United Kingdom 10; China 5.
Oxides and hydroxides		1,057	--	Finland 803; Belgium 137.
Metal, including alloys, all forms		2,109	278	United Kingdom 462; Canada 348; Belgium 333.
Scrap		262	--	Switzerland 64; Netherlands 59; France 35.
Copper:				
Ore and concentrate	thousand metric tons	1,088	--	Chile 374; Peru 269; Argentina 144.
Matte and speiss, including cement copper		10,102	--	Morocco 2,870; Bulgaria 2,460; Canada 2,010.
Ash and residue containing copper		39,004	2,810	Italy 8,310; Netherlands 7,800; Ukraine 3,590.
Metal:				
Unrefined		24,706	--	South Africa 9,390; Armenia 6,720; Congo 4,080.
Refined, not alloyed		833,354	--	Chile 197,000; Russia 176,000; Belgium 75,800.
Alloys, all forms		40,071	--	United Kingdom 7,850; Belgium 6,290; Poland 4,570.
Scrap		563,559	--	Netherlands 67,100; United Kingdom 55,800; France 51,300.
Gallium, indium, and thallium, metal, including scrap		43	7	United Kingdom 17; Slovakia 6; China 6.
Germanium:				
Metal, all forms		20	3	China 17.
Oxides		2,991	437	China 1,210; France 694; United Kingdom 410.
Gold:				
Metal, including alloys, all forms	kilograms	72	11	Switzerland 56.
Waste and sweepings		1,394	--	United Kingdom 763; Poland 141; Hungary 135.
Iron and steel:				
Ore and concentrate	thousand metric tons	44,339	--	Brazil 24,000; Canada 7,400; Sweden 4,610.
Ash and residue containing iron		259,811	--	Austria 225,000; Luxembourg 32,000.
Metal:				
Pig iron, cast iron, related materials		713,475	--	Russia 355,000; South Africa 99,900; Brazil 91,300.
Scrap	thousand metric tons	6,034	--	Netherlands 1,090; Czech Republic 1,080; Denmark 742.
Sponge iron, powder		90,064	13,400	Trinidad & Tobago 27,500; Sweden 15,000; Turkey 8,830.
Ferroalloys:				
Ferrochromium		544,619	--	South Africa 350,000; Kazakhstan 95,300; Netherlands 37,000.
Ferromanganese		209,083	--	South Africa 51,200; Norway 44,500; Spain 25,500.

See footnotes at end of table.

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TABLE 4—Continued
GERMANY: IMPORTS OF SELECTED MINERAL COMMODITIES IN 2008[1]

(Metric tons unless otherwise specified)

Commodity	Total	Sources[e] United States	Other (principal)[2]
METALS—Continued			
Iron and steel, metal—Continued:			
Ferroalloys—Continued:			
Ferromolybdenum	17,434	--	Belgium 5,840; United Kingdom 3,990; Armenia 2,210.
Ferronickel	177,851	--	Ukraine 59,200; Greece 33,400; Indonesia 33,300.
Ferrosilicochromium	12,886	--	Belgium 9,370; Kazakhstan 3,500.
Ferrosilicomagnesium	11,536	--	Norway 3,710; Slovenia 2,500; Brazil 2,030.
Ferrosilicomanganese	156,484	--	India 29,400; Norway 24,700; Netherlands 17,400.
Ferrosilicon	215,373	--	Norway 59,400; France 32,700; Poland 20,900.
Ferrotungsten	2,182	--	China 1,520; Sweden 212; Vietnam 129.
Ferrotitanium	13,824	--	United Kingdom 4,300; Netherlands 3,000; Russia 2,310.
Ferrovanadium	5,333	--	Austria 2,990; Czech Republic 645; Russia 469.
Ferroniobium	6,269	--	Brazil 4,410; Netherlands 846; Canada 784.
Other ferroalloys	97,210	--	France 28,200; Russia 25,400; China 9,530.
Steel, crude	67,991	--	Belarus 24,600; Czech Republic 23,100; Ukraine 5,440.
Lead:			
Ore and concentrate	212,602	--	Sweden 62,300; Australia 42,100; Ireland 26,200.
Ash, residues and slimes containing lead	122,747	--	France 79,800; United Kingdom 23,400; Netherlands 9,330.
Lead containing antimony	20,429	--	Russia 7,660; Sweden 6,700; Belgium 2,550.
Metal:			
Alloys, all forms	6,027	--	United Kingdom 3,040; Poland 1,150; Switzerland 976.
Refined	78,414	--	United Kingdom 21,200; Belgium 16,500; Poland 9,490.
Unrefined	13,909	--	Belgium 5,470; Switzerland 4,260; United Kingdom 1,420.
Scrap	28,230	--	Lithuania 9,650; Switzerland 4,150; Netherlands 3,160.
Lithium:			
Carbonate	7,098	731	Chile 6,120.
Oxides and hydroxides	5,420	580	Switzerland 3,830.
Magnesium, metal, including alloys:			
Scrap	19,672	--	China 10,600; Austria 2,730; Spain 1,550.
Unwrought	44,519	--	China 18,500; Austria 9,840; Czech Republic 6,370.
Manganese, ore and concentrate	14,917	820	Netherlands 6,240; Brazil 3,070; Australia 2,190.
Mercury	20	--	Finland 16; Netherlands 3.
Molybdenum:			
Ore and concentrate	9,646	781	Belgium 1,890; China 1,570; Netherlands 1,310.
Oxides and hydroxides, powder	2,201	--	Chile 960; United Kingdom 436; Netherlands 216.
Molybdate	473	114	Italy 152; Chile 76; China 54.
Metal:			
Crude	272	--	China 221; United Kingdom 21.
Scrap	2,344	--	China 870; Austria 642; Armenia 300.
Nickel:			
Ore and concentrate	1,310	595	Thailand 220; Malaysia 182; Egypt 67.
Ash and residue containing nickel	10,672	1,180	Netherlands 1,750; China 1,170; Austria 1,080.
Matte, speiss, related materials	797	--	Netherlands 788.
Oxides and hydroxides	617	--	Czech Republic 249; Canada 177; Finland 66.
Metal:			
Alloys, all forms	6,101	--	Netherlands 3,810; United Kingdom 696; Canada 616.
Unalloyed	68,767	--	Russia 26,200; United Kingdom 13,600; Norway 9,150.
Scrap	18,315	1,390	Austria 4,360; Ukraine 4,270; Sweden 1,250.
Niobium (columbium):			
Ore and concentrate, including tantalum	77,306	--	Unspecified, 100%.
Metal, powder containing both niobium and rhenium	435	--	Brazil 354; Estonia 49.
Scrap containing both niobium and tantalum	328	--	Malaysia 140; Belgium 126; Japan 37.
Platinum-group metals:			
Waste and scrap	10,985	2,180	United Kingdom 1,100; Switzerland 747; Italy 648.

See footnotes at end of table.

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TABLE 4—Continued
GERMANY: IMPORTS OF SELECTED MINERAL COMMODITIES IN 2008[1]

(Metric tons unless otherwise specified)

Commodity		Total	Sources[e] United States	Other (principal)[2]
METALS—Continued				
Platinum-group metals—Continued:				
Metal, including alloys, all forms:				
Platinum	kilograms	37,180	3,380	South Africa 15,600; Belgium 9,890; Russia 2,600.
Palladium	do.	52,562	--	Belgium 15,000; Russia 14,000; United Kingdom 5,780.
Rhodium	do.	5,401	308	Belgium 2,820; South Africa 837; Russia 751.
Iridium, osmium, and ruthenium	do.	3,022	293	South Africa 1,120; United Kingdom 834; Belgium 592.
Rare-earth metals, including alloys:				
Compounds, all forms		673	46	China 236; France 135; Austria 116.
Metal		430	--	Austria 188; China 178; Sweden 28.
Selenium, metal		312	--	Sweden 115; Canada 79; Finland 24.
Silicon, metal		225,184	--	Norway 59,700; Brazil 46,400; France 38,300.
Silver:				
Ore and concentrate		6,024	--	Argentina 4,250; Peru 1,390.
Metal		2,030	--	Unspecified 696; Kazakhstan 568 Morocco 240.
Powder	kilograms	189,150	96,300	France 77,700; Switzerland 11,000.
Tantalum, metal:				
Powder	do.	41,157	6,170	Kazakhstan 28,200; Thailand 3,620.
Waste and scrap	do.	106,499	40,200	United Kingdom 30,500; China 7,350; Thailand 7,030.
Tin:				
Ore and concentrate		121	--	Rwanda, 100%.
Ash and residue containing tin		472	--	Belgium 408; France 42.
Metal:				
Alloys, all forms		179		Netherlands 107; United Kingdom 23; France 20.
Crude		22,161	--	Peru 4,610; Indonesia 4,210; Belgium 3,660.
Waste and scrap		2,243	--	Netherlands 541; United Kingdom 518; France 482.
Titanium:				
Ore and concentrate		725,561	--	Norway 290,000; Canada 185,000; South Africa 148,000.
Oxide		14,873	--	France 4,740; Finland 2,220; China 1,810.
Titaniferous slag		76,107	--	Canada 66,400; South Africa 8,220.
Metal:				
Powder		9,864	--	Kazakhstan 5,800; Japan 819; United Kingdom 740.
Waste and scrap		4,210	286	Italy 1,570; Austria 316; Switzerland 282.
Tungsten:				
Ore and concentrate		967	532	Rwanda 326.
Carbide		2,526	192	Austria 808; Canada 467; China 452.
Oxides and hydroxides		665	112	China 463; Russia 80.
Wolframite		3,035	595	China 1,600; Russia 540; Ireland 255.
Metal:				
Crude		167	55	China 35; Austria 34; United Kingdom 26.
Powder		1,735	90	Austria 833; Canada 399; Finland 144.
Waste and scrap		3,114	364	Italy 358; United Kingdom 339; Switzerland 315.
Vanadium:				
Ore and concentrate		60	--	United Kingdom 59.
Oxides and hydroxides		879	--	Unspecified, 100%.
Metal, including scrap		139	49	United Kingdom 31; Russia 28; France 15.
Zinc:				
Ore and concentrate		383,789	66,000	Ireland 106,000; Peru 72,900; Sweden 62,200.
Matte and related materials		11,135	--	Netherlands 2,490; Austria 2,320; Belgium 2,170.
Ash and residue containing zinc		25,355	1,650	Switzerland 6,440; Austria 4,390; Netherlands 2,360.
Metal:				
Alloys, all forms		89,737	--	Belgium 62,000; Netherlands 9,060; United Kingdom 7,360.
Unalloyed		305,076	--	Finland 87,300; Spain 80,200; Netherlands 53,400.
Powder and dust		6,523	--	Unspecified 6,220.
Waste and scrap		17,395	--	France 3,900; Netherlands 3,250; Denmark 2,590.

See footnotes at end of table.

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TABLE 4—Continued
GERMANY: IMPORTS OF SELECTED MINERAL COMMODITIES IN 2008[1]

(Metric tons unless otherwise specified)

Commodity		Total	Sources[e] United States	Other (principal)[2]
METALS—Continued				
Zirconium:				
Metal		244	--	Netherlands 175; China 30; France 29.
Waste and scrap		6	--	Russia 5; United Kingdom 1; Austria < 1.
INDUSTRIAL MINERALS				
Abrasives, natural:				
Corundum, emery, garnet, etc.		26,855	--	India 18,900; China 4,570.
Pumice		5,516	1,120	Iceland 4,160.
Asbestos, crude		54	18	Canada 36.
Barite		278,335	--	China 244,000; Netherlands 18,400.
Borates, natural, including calcined		6,425	--	Turkey 3,100; Belgium 2,420; Argentina 430.
Cement	thousand metric tons	1,078	--	France 333; Netherlands 184; Luxembourg 179.
Chalk, natural		257,909	--	Netherlands 88,700; Belgium 74,300; France 71,700.
Clays, crude:				
Bentonite		361,782	--	Netherlands 150,000; Czech Republic 51,700; Italy 48,500.
Kaolin		647,278	177,000	United Kingdom 155,000; Belgium 86,700; Netherlands 66,700.
Other, unspecified		239,576	71,200	Czech Republic 49,400; Luxembourg 30,200; United Kingdom 18,900.
Diamond, natural:				
Gem, not set or strung	carats	699,619	--	India 418,000; Belgium 175,000; Israel 40,600.
Industrial stones	do.	502,045	--	United Kingdom 179,000; Belgium 110,000; Netherlands 51,200.
Dust and powder	kilograms	9,178	927	Ireland 2,950; China 2,430; Switzerland 909.
Diatomite and other infusorial earth		49,236	7,530	Denmark 21,300; Mexico 8,810; Italy 4,680.
Feldspar		143,758	--	Turkey 38,700; Norway 34,800; France 27,000.
Fluorspar:				
Acid-grade		299,527	--	South Africa 108,000; Namibia 67,400; China 59,000.
Metallurgical-grade		58,388	--	United Kingdom 50,400; Netherlands 3,800.
Graphite, natural		62,180	--	China 37,200; Unspecified 6,400; Austria 54,700.
Gypsum and anhydrite, natural		131,207	--	France 49,600; Austria 36,000; Netherlands 22,600.
Kyanite and related materials:				
Andalusite, kyanite, sillimanite		56,555	3,450	South Africa 28,400; France 18,100; Belgium 3,680.
Mullite		23,113	--	China 13,800; United Kingdom 3,100; Hungary 2,800.
Lime, hydrated		538,198	--	France 358,000; Czech Republic 84,000; Belgium 43,100.
Magnesium compounds:				
Magnesite, natural, including burned		571,038	--	China 214,000; Netherlands 155,000; Slovakia 34,300.
Epsomite		501	--	Netherlands 476; France 25.
Meerschaum, sepiolite		5,979		Spain 3,490; Netherlands 1,490; Belgium 568.
Mica, natural, including splittings and waste		34,527	--	India 10,200; China 10,200; France 7,080.
Peat, natural		887,447	--	Lithuania 259,000; Netherlands 253,000; Latvia 184,000.
Phosphates:				
Crude		142,507	--	Netherlands 60,300; Israel 53,900; Morocco 9,260.
Milled		3,398	--	France 1,410; Denmark 1,190; Poland 350.
Precious and semiprecious stones, natural (other than diamond):				
Gem, not set or strung		1,242	--	Brazil 706; South Africa 119; China 101.
Industrial stones	grams	57,113	15,500	China 29,900; Republic of Korea 9,080.
Pyrite, unroasted		109,955	--	Finland 104,000.
Salt and brine	thousand metric tons	2,319	--	Netherlands 1,990; United Kingdom 116.
Stone, sand and gravel:				
Basalt, lava rocks, etc.		75,855	--	Norway 49,500; Italy 9,940; Netherlands 4,780.
Crushed rock, macadam		14,775	--	Switzerland, 100%.
Dimension stone:				
Dolomite and limestone		677,105	--	Estonia 277,000; Belgium 266,000; Norway 48,100.
Granite		187,617	--	Norway 84,600; Poland 15,600; Austria 15,000.
Marble, travertine, etc.	thousand metric tons	2,513	--	Norway 1,120; Austria 990; Italy 246.

See footnotes at end of table.

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TABLE 4—Continued
GERMANY: IMPORTS OF SELECTED MINERAL COMMODITIES IN 2008[1]

(Metric tons unless otherwise specified)

Commodity		Total	Sources[e]	
			United States	Other (principal)[2]
INDUSTRIAL MINERALS—Continued				
Stone, sand and gravel—Continued:				
Limestone for cement	do.	2,095	--	Belgium 633; Austria 553; Poland 421.
Quartz and quartzite		90,550	--	Austria 35,900; Brazil 16,200; Sweden 9,240.
Sand, natural	thousand metric tons	1,984	--	France 1,190; Netherlands 351; Belgium 187.
Sandstone		20,231	--	India 8,090; Poland 3,520; Netherlands 2,120.
Schist and shale		28,538	--	France 20,300; Brazil 5,540.
Natural stones, unworked	thousand metric tons	1,374	--	France 1,140; Netherlands 102.
Other natural stone, unspecified	do.	8,398	--	Norway 5,130; United Kingdom 1,210; Poland 949.
Sulfur		53,601	--	Belgium 24,800; Netherlands 15,300; Norway 6,650.
Talc, steatite and soapstone, natural		338,606	--	Netherlands 98,900; France 62,600; Austria 56,200.
Vermiculite and perlite, natural		137,449	--	Greece 101,000; Hungary 19,400; South Africa 13,300.
MINERAL FUELS AND RELATED MATERIALS				
Asphalt and bitumen, natural		36,752	3,680	Switzerland 9,960; Trinidad & Tobago 4,520; Poland 3,530.
Coal:				
Bituminous:				
Anthracite	thousand metric tons	4,138	368	South Africa 2,140; Colombia 480; Russia 463.
Coke	do.	4,873	--	Poland 1,560; China 629; Australia 624.
Semicoke, coking coal	do.	9,392	2,550	Australia 4,400; Canada 1,610; Russia 610.
Other, including briquets	do.	27,848	2,700	Russia 6,710; South Africa 5,960; Colombia 5,240.
Lignite		84,576	--	Czech Republic 80,200.
Coke of lignite		2,597	--	Austria 1,460; Italy 1,130.
Gas, natural, gaseous	thousand metric tons	78,227	--	Unspecified, 100%.
Petroleum, crude	do.	105,836	--	Russia 33,900; United Kingdom 15,100; Norway 14,700.
Uranium, natural:				
Crude, U content		2,923	246	France 1,690; United Kingdom 856.
Enriched, fissile isotopes	kilograms	23,506	--	France 12,100; Russia 7,830; Netherlands 2,090.

[e]Estimated; estimated tonnages are rounded to no more than three significant digits; may not add to totals shown. -- Less than 5%.
[1]Source: Bundesanstalt für Geowissenschaften und Rohstoffe, 2009, Table 1—Rohstoffsituation, 2008: Hannover, Germany, October.
[2]Source country was estimated to have accounted for at least 5% of Germany's total imports of the mineral commodity.

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The Mineral Industry of Greece

By Harold R. Newman

The Government's concern over the state of the Greek economy continued in 2009 when Greece's budget deficit reached 12% of the country's gross domestic product (GDP), which was far above the European Union (EU) guideline of 3%. The country's ratio of national debt to GDP was expected to be 135% by yearend 2009. The country's sovereign debt credit default swaps (CDS), which are the financial instruments that measure the price of protection against default, stood at 202 basis points, which was among the highest in the euro area. The Government was continuing efforts to reform the economy and reduce its CDS basis points and public spending. The budget crisis affected all sectors of the economy, including the mineral resources sector (Moya, 2009).

Geologic studies in Greece were done primarily by the Institute of Geology and Mining Exploration (IGME). These studies were done to provide general information on deposit size, location, and quality of various minerals to interested parties. Most exploration activity was in northern Greece, which was thought to contain a significant amount of exploitable minerals.

Minerals in the National Economy

Mining has been significant to the Greek economy since ancient times. The mineral industry produced or processed metals, industrial minerals, and mineral fuels.

During the past 20 years, the significance of the mineral industry to the Greek economy had slowly lessened. The size of the mineral economy of the country was small, although from the standpoint of domestic economic development, mineral industry activities have traditionally been an important segment of Greek industry. Most of the Greek companies that dealt in metals fabrication, mining of minerals, and refined metals production or processing were well established and had a strong export orientation.

Greek merchandise exports in 2009 totaled $20.1 billion, of which fuels and mining products accounted for $16.9 million. Imports totaled $59.1 billion, of which fuels and mining products accounted for $7.3 million (World Trade Organization, 2009).

Production

Greece was a global supplier of several key industrial minerals and a significant producer of bauxite, caustic-calcined magnesium, mined nickel, and screened perlite in the EU. Production of mineral commodities in Greece was closely tied to the export market. In 2009, Greece was the world's leading producer of perlite (30%) and the world's third ranked producer of pumice (11%) after Turkey and Italy; it also was estimated to have produced about 9% of the world's bentonite and 1% of the world's bauxite and nickel. In terms of the value of production, bauxite was the most important of Greece's mineral commodities (Bolen, 2010; Bray, 2010; Crangle, 2010; Kuck, 2010; Virta, 2010).

The country's mineral production levels in 2009 were more or less the same as those of 2008 except for notable decreases in the production of pumice (by 54%), mined nickel (50%), mined lead (27%), primary aluminum (17%), crude steel (16%), bauxite and zinc (11% each), and alumina (7%). These decreases were related mostly to the changes in demand and to the country's and companies' economic situations. Bauxite, which was the raw material needed for aluminum production, and lignite, which is used as a fuel in powerplants, were the two most abundant minerals in Greece (table 1).

Structure of the Mineral Industry

The major mineral commodities and the companies that produced them in 2009 are listed in table 2. Nearly all companies in Greece were privately owned; Government ownership was limited to the mineral fuels sector.

Commodity Review

Metals

Bauxite and Alumina and Aluminum.—In 2009, Greece was a leading bauxite producer in the EU, and S&B Industrial Minerals S.A. controlled most of the significant bauxite reserves in Greece. The major bauxite deposits are located in central Greece within the Parnassos-Ghiona geotectonic zone and on Evoia Island. Greece's estimated 100 million metric tons (Mt) of bauxite reserves were of diasporic and boehmitic type (S&B Industrial Minerals S.A., 2009a).

Aluminium de Grèce S.A. produced alumina from bauxite and aluminum through electrolysis. The company's industrial plant had the capacity to produce 800,000 metric tons per year (t/yr) of alumina and 165,000 t/yr of aluminum. The aluminum was marketed to automobile manufacturers and manufacturers of building materials and packaging. The company's subsidiary Delphi-Distomon S.A. mined bauxite from underground mines; the bauxite was used by Aluminium de Grèce to produce alumina for aluminum production (Aluminium de Grèce S.A., 2009).

Gold.—Hellas Gold S.A., which was a subsidiary of European Goldfields Ltd. of Canada, owned three gold and base-metal deposits in northern Greece. These were the Olympias deposit, which contained gold, lead, silver, and zinc; the Skouries gold deposit; and the Stratoni deposit, which is a polymetallic deposit. These deposits were part of the Kassandra property in northern Greece.

In 2009, the Olympias and the Skouries deposits remained in the development stage. Hellas Gold continued selling gold concentrates from an existing stockpile at Olympias and had applied for the relevant permits to re-treat tailings and resume

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underground mining at the property as soon as the necessary permits are awarded. The Olympias project benefited from the extensive mining and plant infrastructure already in place, including a concentrating plant, a shaft down to a depth of 400 meters (m) below the surface, and a port facility nearby at Stratoni (European Goldfields Ltd., 2009a).

The Skouries gold project is located 35 kilometers (km) from Stratoni in northern Greece and was a typical porphyry deposit that formed a nearly vertical pipe. The project was in the basic engineering and construction stage. Skouries benefited from a simple metallurgical process and would produce clean concentrate using flotation as well as doré from the gravity circuit. The mine's estimated proven reserves were 77.5 Mt grading 0.87 gram per metric ton (g/t) gold and its estimated probable reserves were 68.7 Mt grading 0.83 g/t gold (European Goldfields Ltd., 2009b).

Cape Lambert Resources Ltd. of Australia's Sappes gold project is located in northeastern Greece about 30 km northwest of the port city of Alexandroupolis. Cape Lambert planned to add value to Sappes by completing the bulk of the project permitting. Sappes is located on a 20.1-square-kilometer lease and was based on the development of the underground Viper deposit and an open pit at the St. Demetrios deposit. A feasibility study in 2006 proposed production of about 2,835 kilograms of gold in doré and flotation concentrate during a 5-year period. The estimated total resources at Viper were 0.99 Mt grading 21.4 g/t gold. The estimated total resource at St. Demetrios was 0.8 Mt grading 3.4 g/t gold (Cape Lambert Resources Ltd., 2009).

Lead, Silver, and Zinc.—The Stratoni ore body is a polymetallic massive replacement-type deposit with estimated proven and possible reserves of 2.3 Mt grading 7.7% lead, 203 g/t silver, and 9.9% zinc. The mine, which had an expected life of 10 years from the commencement of mining in 2005, produced a lead-silver concentrate and a zinc concentrate by a conventional underground drift-and-fill method. This method is ideally suited to this high-grade ore body as it minimizes dilution, maximizes recovery of ore, and allows the headings to change direction with the changing ore geometry (European Goldfields Ltd., 2009c).

Nickel.—Larco G.M.M. S.A. (Larco), which was a leading producer of nickel in Europe, used domestic nickel ores. The Government was seeking to cut its budget deficit and was reported to be looking for a strategic investor in Larco and ultimately considering the sale of a controlling interest. PricewaterhouseCoopers LLP of the United States was advising the Government on the privatization. Larco had a pre-tax loss of $165.9 million in 2008 and announced that it was reducing production by 55% in 2009 owing to decreased demand and higher production costs (Reuters, 2009).

Industrial Minerals

Bentonite.—S&B was the leading bentonite producer in Europe and the second ranked bentonite producer after the United States. S&B mined bentonite from its reserves on the island of Milos. S&B was the leading exporter of bentonite in the world. S&B remained focused on supplying bentonite for foundries and the drilling industry (S&B Industrial Minerals S.A., 2009b).

Cement.—The CTP Team, which was part of the Bedeschi Group of Italy, commissioned a new bag filter system for dust filtration of kiln and raw mill exhaust gas at the Paralia Aspropyrgos cement plant, which was owned by Halyps Cement S.A. (a member of the Ciments Français Group). To install the new system, the existing conditioning tower had to be modified. A new lime injection system for SOx reduction was also installed. The filter system implements a new gas distribution solution specifically designed to enhance the lime reaction and thereby improve the control of sulfur emissions (Bulk Solids Handling, 2009).

Heracles General Cement S.A., which was a member of the Lafarge Group of France, had three cement plants in Greece. Heracles was the leading processor of carbonate material in the country. The company had one plant in Volos, which was the largest-capacity [4.6 million metric tons per year (Mt/yr)] cement plant in Europe; one plant in Halkis Evia; and one plant in Milaki Evia. The total combined production capacity of the three plants was 9.6 Mt/yr (Google Finance, 2009).

Titan Cement Co. S.A. was a significant cement producer. Titan's four plants produced a total of about 6 Mt/yr and commanded a 40% market share. Titan was engaged in an extensive investment program and had become a diversified and vertically integrated company, having adding ready-mix concrete production, and cement products, including cement blocks and mortar to its production capabilities (Titan Cement Company S.A., 2009).

Perlite.—S&B was the leading perlite supplier in the world. S&B announced its participation as coordinator in a €8.3 million ($11.1 million[1]) research project, €5 million ($6.7 million) of which would be funded by the European Commission, Research Directorate General, within the 7th Framework Programme. The objectives of the project, which had the code name "ExPerl," included the development of perlite micro-particles that would have special insulating and mechanical properties highly exceeding those of conventional perlite and the development of innovative end products based on perlite to be used in the chemical, construction, and manufacturing industries. The project would be carried out over a 4-year period by a network of 12 industrial partners, research centers, and universities from Germany, Greece, Israel, Italy, Norway, and Spain. The research and development project was expected to lead to new and more eco-efficient products (S&B Industrial Minerals S.A., 2009c).

Mineral Fuels

Coal.—In 2009, the predominant fuel used in electricity generation in Greece was lignite, and Public Power Corp. (PPC) was Greece's major producer of lignite. PPC owned and operated about 100 generating plants with about 12,760 megawatts of capacity from hydroelectric, thermal, and renewable sources. PPC lignite mines in Megalopolis and Ptolemais provided lignite for power generation. Eight PPC lignite-powered powerplants represented 42% of the country's

[1]Where necessary, values have been converted from European Union euros (€) to U.S. dollars (US$) at a rate of €1.00=US$1.34.

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total installed capacity and generated about 56% of the country's electrical energy. In terms of lignite production, Greece ranked second in the EU and sixth worldwide (Public Power Corp., 2009).

At yearend 2009, Greece had an estimated 3,900 Mt of coal reserves, which was 0.47% of the world total. In terms of the volume of lignite production in the EU, Greece was second to Germany. Domestic production was partly open to private companies, but PPC remained the leading producer in 2009 with the right to exploit 63% of the known reserves. Greece had no hard coal reserves and consequently imported hard coal from Columbia, Russia, South Africa, and Venezuela (MBendi Information Services (Pty) Ltd., 2009).

Natural Gas.—Production of natural gas was negligible owing to Greece's limited natural gas reserves. Its Mediterranean location, however, makes it conveniently close to several important producing regions, such as the Caspian Sea area, the Middle East, and North Africa, which could help meet its energy requirements.

Petroleum.—Following the successful completion of the drilling of the PNA-H3 well in the Pinos North field, Aegean Energy S.A. announced the commencement of a new drilling operation in the Epsilon field. Aegean signed a contract for the Ensco 85 drilling rig, which would undertake the drilling operations. Ensco 85 is a jackup-rig-type independent-leg cantilever; it has a maximum drilling depth of 7,600 m and a 2,000 horsepower drawworks. Aegean also signed a $50 million financing agreement with the Standard Chartered Bank and appointed Schlumberger Ltd. of the United States to provide drilling management services. The new well was expected to reach a total depth of 5,500 m, and the drilling operations were expected to last about 90 days. The Epsilon well would be the deepest well to be drilled in Greece (Rigzone.com, 2009).

The Government announced that construction on the Burgas-Alexandroupolis pipeline could start in 2010. Bulgaria, Greece, and Russia had signed a memorandum of understanding regarding the Burgas-Alexandroupolis pipeline in April 2005. Once completed, the pipeline would pump 257 million barrels per year (Mbbl/yr) of crude oil. This volume could eventually be increased to 368 Mbbl/yr of crude oil. Russia held a 51% interest in the project, and Bulgaria and Greece each held a 24.5% interest. The Government stated that the project would help make the supply of energy to Europe more reliable (Budapest Business Journal, 2009).

Outlook

Greece's economic outlook for 2009 to 2010 is not expected to improve, even though the Government planned to continue its vigorous efforts to reform the economy and address the serious debt issue. Greece is expected to remain a major supplier of bauxite and industrial minerals in the international market. Mineral exploration activities in Greece are expected to be intensified to secure additional high-quality reserves of various minerals. The Government is expected be involved in planning investment programs to improve the existing installations and to lower operating costs.

References Cited

Aluminium de Grèce S.A., 2009, Introduction—History: Aluminium de Grèce S.A. (Accessed December 12, 2010, at http://www.alhellas.com/default.asp?siteID=3&pageID=3&langID=2.)

Bolen, W.P., 2010, Perlite: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 116-117.

Bray, E.L., 2010, Bauxite and alumina: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 26-27.

Budapest Business Journal, 2009, Burgas-Alexandroupolis oil pipeline construction to start in 2010: Budapest Business Journal, March 27. (Accessed May 14, 2009, at http://www.gasandoil.com/goc/news/nte91988.htm.)

Bulk Solids Handling, 2009, Bag filter for exhaust gas dust filtration: Vogel Business Media. (Accessed January 1, 2011, at http://www.bulk-solids-handling.com/safety_environment/emission_control/articles/269345.)

Cape Lambert Resources Ltd., 2009, Sappes gold: Cape Lambert Resources Ltd. (Accessed January 2, 2011, at http://www.capelam.com.au/irm/content/projects_sappes.html.)

Crangle, R.D., Jr., 2010, Pumice and pumicite: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 124-125.

European Goldfields Ltd., 2009a, Olympias project & gold sales: European Goldfields Ltd. (Accessed October 2, 2010, at http://www.egoldfields.com/egoldfields/en/operationsprojects/greece/olympias.)

European Goldfields Ltd., 2009b, Skouries project: European Goldfields Ltd. (Accessed October 2, 2009, at http://www.egoldfields.com/egoldfields/en/operationsprojects/greece/skouries.)

European Goldfields Ltd., 2009c, Stratoni operation: European Goldfields Ltd. (Accessed September 28, 2009, at http://www.egoldfields.com/egoldfields/en/operationsprojects/greece/statoni.)

Google Finance, 2009, Heracles General Cement Company: Google Finance. (Accessed April 23, 2011, at http://www.google.com/finance?q=ATH:HRAK.)

Kuck, P.H., 2010, Nickel: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 108–109.

MBendi Information Services (Pty) Ltd., 2009, Coal mining in Greece—Overview: MBendi Information Services (Pty) Ltd. (Accessed September 17, 2010, at http://www.mbendi.com/indy/ming/coal/eu/gr/p0005.htm.)

Moya, Elena, 2009, Investors' fears grow over Greek economy: guardian.co.uk, November 30. (Accessed September 17, 2010, at http://www.guardian.co.uk/business/2009/nov/30/greece-economy-budget-deficit-fears.)

Public Power Corp., 2009, Mines: Public Power Corp. (Accessed January 1, 2011, at http://www.dei.gr/Default.aspx?id=890&nt=19.)

Reuters, 2009, Greece's Larco sale sparks investor interest: Thomson Reuters, August 24. (Accessed January 1, 2011, at http://www.reuters.com/assets/print?aid=UKLO58981020090824.)

Rigzone.com, 2009, Aegean starts 2nd phase of drilling at Epsilon offshore Greece: Rigzone.com. (Accessed September 10, 2009, at http://www.rigzone.com/news/article_pf.asp?a_id=80216.)

S&B Industrial Minerals S.A., 2009a, Natural resources—Industrial solutions—Annual report 2009: S&B Industrial Minerals S.A., 140 p. (Accessed October 2, 2010, at http://www.sandb.gr/en/pdf/annual_report_2009_en.pdf.)

S&B Industrial Minerals S.A., 2009b, Bentonite: S&B Industrial Minerals S.A. (Accessed January 1, 2011, at http://www.s.andb.gr/en/main_in.html?title_bentonitis.gif?bentonitis_bentonitis.html.)

S&B Industrial Minerals S.A., 2009c, S&B announces its participation as coordinator in a €8.3 million research project, co-funded by the EU, for the development of innovative and high added value perlite projects: S&B Industrial Minerals S.A. press release, July 21, 1 p. (Accessed October 2, 2010, at http://www.s.andb.gr/en/pdf/21_07_09.pdf.)

Titan Cement Company S.A., 2009, Company history: Titan Cement Company S.A. (Accessed January 1, 2001, at http://www.fundinguniverse.com/company-histories/Titan-Cement-Company-SA-Company-History.html.)

Virta, R.L., 2010, Clays: U S. Geological Survey Mineral Commodity Summaries 2010, p. 44–45

World Trade Organization, 2009, Greece—Country profile: World Trade Organization. (Accessed December 9, 2010, at http://stat.wto.org/CountryProfiles/GR_e.htm.)

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TABLE 1

GREECE: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007[e]	2008[e]	2009[e]
METALS						
Aluminum:						
Bauxite		2,441,443	2,162,900	2,125,900 [3]	2,176,300 [3]	1,935,000 [3]
Alumina, Al_2O_3		782,000	775,000 [e]	760,000 [r]	771,769 [r, 3]	718,797 [3]
Metal:						
Primary		163,286	164,800	166,300 [3]	162,300 [3]	134,737 [3]
Secondary[e]		3,000	3,000	3,000	3,000	3,000
Chromite, ore, crude		1,477	1,450	1,400	1,400	1,400
Iron and steel:						
Iron ore and concentrate, nickeliferous, Fe content[e]		575,000	575,000	575,000	570,000	560,000
Metal:						
Steel, crude	thousand metric tons	2,266	2,416	2,554 [3]	2,477 [3]	2,082 [3]
Ferroalloys, ferronickel, gross weight		102,162	100,000 [e]	100,000	100,000	100,000
Lead:[e]						
Mine output, Pb content		3,000	10,500	15,000	23,314 [r, 3]	17,027 [3]
Metal, secondary	thousand metric tons	6	6	11	11	10
Manganese:[e]						
Ore, crude:						
Gross weight		100	100	100	100	100
Mn content		15	15	15	15	15
Concentrate:						
Gross weight		20	20	20	20	20
Mn content		15	15	15	15	15
Nickel:						
Ore, Ni content of nickeliferous iron ore		23,210	21,670	21,200	16,640 [r, 3]	8,269 [3]
Metal, Ni content of ferronickel		19,235	17,700	18,700 [3]	18,600 [r]	18,500
Silver, mine output, Ag content	kilograms	2,300	25,900	38,300	35,500	36,000
Zinc, mine output, Zn content by analysis		1,300	16,414	17,700 [3]	20,300	18,126 [3]
INDUSTRIAL MINERALS						
Abrasives, natural emery[e]		8,000	8,000	8,000	8,000	8,000
Aggregates	thousand metric tons	8,500	8,000	7,500	8,500	6,500
Barite, concentrate[e]		30	--	--	--	--
Cement, hydraulic	thousand metric tons	15,166	15,000 [e]	15,000	14,000	12,000
Clays:						
Bentonite, crude		1,124,795	1,125,000	950,000	1,500,000 [r]	844,804 [3]
Kaolin, crude		49,912	50,000 [e]	40,000	4,360 [r, 3]	– [3]
Feldspar		100,586	100,000 [e]	100,000	62,000 [r, 3]	28,617 [3]
Gypsum and anhydrite		865,216	865,000 [e]	865,000	865,000	730,000 [3]
Magnesite:						
Crude		475,670	463,277	351,414 [3]	455,069 [r, 3]	250,234 [3]
Dead-burned		58,089	58,000 [e]	56,000	58,000	48,000
Caustic-calcined		68,065	70,000 [e]	70,000	70,000	70,000
Huntite, crude[e]		18,000	18,000	18,000	19,600 [r, 3]	10,652 [3]
Nitrogen, N content of ammonia		130,000	130,000 [e]	130,000	130,000	130,000
Perlite:						
Crude		1,075,129	1,100,000 [e]	1,100,000	1,100,000	1,100,000
Screened		550,000	550,000 [e]	550,000	500,000	398,451 [3]
Pozzolan, Santorin earth		1,458,850	1,500,000 [e]	1,400,000 [r]	1,059,000 [r, 3]	830,000 [3]
Pumice		852,000	850,000	900,000	828,000	381,000 [3]
Salt, all types		198,024	195,000	195,000	220,000 [r]	189,000
Silica[e]		125,000	125,000	100,000	64,521 [r, 3]	37,905 [3]
Sodium compounds:[e]						
Carbonate		750	750	750	750	750
Sulfate		5,000	5,000	5,000	5,000	5,000
Stone:[e]						
Dolomite		60,000	60,000	60,000	60,000	60,000
Marble	cubic meters	151,180 [3]	250,000	250,000	347,526 [r, 3]	255,516 [3]
Flysch		93,509 [3]	95,000	95,000	95,000	95,000
Quartz, microcrystalline	thousand metric tons	150	150	150	150	150

See footnotes at end of table.

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TABLE 1—Continued

GREECE: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007[e]	2008[e]	2009[e]
INDUSTRIAL MINERALS—Continued						
Sulfur:[e]						
S content of mixed sulfide ore		250,000 [r]	250,000 [r]	250,000 [r]	264,299 [r, 3]	225,054 [3]
Byproduct, natural gas and petroleum		160,000	160,000	150,000	150,000	150,000
Talc and steatite		250	250	200	200	200
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Lignite	thousand metric tons	73,585	64,520	73,092 [r, 3]	64,521 [r, 3]	62,730 [3]
Lignite briquets[e]		36,000	36,000	36,000	36,000	36,000
Gas:[e]						
Manufactured, gasworks	million cubic meters	15	15	15	15	15
Natural	do.	16	16	15	14	11 [3]
Natural gas plant liquids	thousand 42-gallon barrels	140 [e]	140	140	140	140
Petroleum:						
Crude	do.	756	668	660	478	628 [3]
Refinery products:						
Liquefied petroleum gas[e]	do.	8,900	7,575 [3]	8,000	8,000	8,000
Gasoline	do.	32,725	32,000 [e]	32,000	32,000	32,000
Naphtha	do.	8,330	8,400	8,400	8,400	8,400
Mineral jelly and wax[e]	do.	20	20	20	20	20
Jet fuel[e]	do.	16,000	16,000	16,000	16,000	16,000
Kerosene	do.	132	130 [e]	130	130	130
Distillate fuel oil	do.	43,268	42,000 [e]	42,000	42,000	42,000
Refinery gas	do.	4,900	4,800 [e]	4,800	4,800	4,800
Lubricants	do.	1,260	1,200 [e]	1,200	1,200	1,200
Residual fuel oil	do.	50,616	50,000 [e]	50,000	50,000	50,000
Bitumen	do.	3,121	3,000 [e]	3,000	3,000	3,000
Petroleum coke	do.	990	1,000 [e]	1,000	1,000	1,000
Other	do.	980	900 [e]	900	900	900
Refinery fuel and losses	do.	7,500	7,500 [e]	7,500	7,500	7,500
Total	do.	178,742	175,000 [e]	175,000	175,000	175,000

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. do. Ditto. -- Zero.

[1]Table includes data available through August 31, 2010.

[2]In addition to the commodities listed, other crude construction materials are produced, but available information is inadequate to make reliable estimates of output.

[3]Reported figure.

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TABLE 2
GREECE: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Alumina, Al_2O_3	Aluminium de Grèce S.A (AdG) (Mytilineos Holdings S.A., 53%)	Agios Nikolaos, Boeotia area	800
Aluminum	do.	do.	165
Asbestos	Hellenic Mineral Mining Co. S.A.	Mines at Zidani, near Kozani	100
Barite, $BaSO_4$	S&B Industrial Minerals, S.A. (Eliopoulos-Kyriakopoulos Group)	Milos Island	1
Bauxite	do.	Mines at Phocis, plants at Phocis and Itea	2,000
Do.	Eleusis Bauxites Mines, S.A.	Mines near Drama, Itea, and Phthiotis-Phocis	300
Do.	do.	Plants in Aghia Marina, Drama, and Itea	400
Do.	Delphi-Distomon S.A.and Hellenic Bauxites of Distomon S.A. (Aluminium de Grèce S.A.)	Beotia and Phokifda Mines, Delphi-Distomon area	500
Bentonite:			
Crude	Mediterranean Bentonite Co. S.A. (Industria Chemica Mineraria S.p.A.)	Surface mines on Milos Island	20
Do.	Mykobar Mining Co. S.A. (Silver & Baryte Ores Mining Co. S.A.)	Mines at Adamas, Milos Island	300
Do.	do.	Plants at Adamas, Milos Island	200
Do.	S&B Industrial Minerals, S.A. (Eliopoulos-Kyriakopoulos Group)	Mines at Adamas, Milos Island	600
Processed	do.	Plant at Voudia Bay, Milos Island	400
Cement	Halkis Cement Co. S.A. (Lafarge Group)	Micro-Vathi plant, west-central Euboea Island	3,000
Do.	Halyps Cement S.A. (Ciments Français Group)	Paralia Aspropyrgos plant, Athens	800
Do.	Heracles General Cement S.A. (Lafarge Group)	Plants at Halkis Evia, Milaki Evia, and Volos	9,600
Do.	Titan Cement Co. S.A.	Elefsis plant, Athens area	400
Do.	do.	Kamari plant, Boeotia	2,600
Do.	do.	Patras plant, northern Peloponnesus	1,900
Do.	do.	Salonica plant, Salonica	1,650
Ferroalloys, ferronickel, Ni content	Larco G.M.M. S.A.	Larymna metallurgical plant	25
Gold, Au in concentrate kilograms	Hellas Gold S.A. (European Goldfields Ltd.)	Kassandra Mines [Olympias (closed) and Stratoni] northeastern Chalkidike	5,000
Gypsum	Lava Mining and Quarrying Co. S.A.	Altsi, Crete Island	500
Do.	Titan Cement Co. S.A.	do.	280
Hunite/hydromagnesite	Microfine S.A.	Mines in Kozani Basin	100
Lead, mine, Pb in concentrate	Hellas Gold S.A. (European Goldfields Ltd.)	Kassandra Mines [Olympias (closed) and Stratoni], northeastern Chalkidike	30
Lignite	Public Power Corp. (PPC) (Government)	Aliveri Mine, Euboea Island	420
Do.	do.	Megalopolis Mine, central Peloponnesus	7,000
Do.	do.	Ptolemais Mine, near Kozani	28,000
Magnesite, concentrate	Grecian Magnesite S.A. (GM)	Mine and plant at Gerakini and Kalives, Chalkidiki, northern Greece	200
Manganese, battery-grade MnO_2	Eleusis Bauxite Mines Mining, Industrial and Shipping S.A. [National Bank of Greece (OAE)]	Nevrokopi, Drama	10
Marble, slab and tile cubic meters	Aghia Marina Marble Ltd.	Various areas of Northern Greece	NA
Do. do.	Michelakis Marble S.A.	Kavala	NA
Do. do.	Gourlis Group	Quarries at Levadia, Neurokopi, and Tiseo	NA
Natural gas million cubic meters per day	Public Petroleum Corp. (PPC) (Government)	Prinos offshore gasfield and oilfield, east of Thasos Island	125
Nickel, ore	Larco G.M.M. S.A.	Agios Ioannis Mine, near Larymna	700
Do.	do.	Evia Mine, near Larymna	1,500
Nitrogen, N content of ammonia	Phosphoric Fertilizers S.A.	Nea Karvali	150
Perlite	S&B Industrial Minerals, S.A. (Eliopoulos-Kyriakopoulos Group)	Mines on Kos and Milos Islands; plant at Pireaus	650
Do.	Otavi Minen Hellas S.A. (Otavi Minen AG)	Milos Island	150
Do.	Bouras Co.	Kos Island	50

See footnotes at end of table.

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TABLE 2—Continued
GREECE: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Petroleum, refined	42-gallon barrels per day	Hellenic Aspropyrgos Refinery S.A.	Aspropyrgos	95,000
Do.	do.	Motor Oil (Hellas) Corinth Refineries S.A.	Aghii Theodori, Corinth	170,000
Do.	do.	Petrola Hellas S.A.	Eleusis	100,000
Do.	do.	Thessaloniki Refining Co. A.E.	Thessaloniki	76,000
Pozzolan (Santorin earth)		Lava Mining and Quarrying Co. (Heracles General Cement Co.)	Xylokeratia, Milos Island	600
Do.		Titan Cement Co. S.A.	do.	300
Do.		Lava Mining and Quarrying Co. (Heracles General Cement Co.)	Yali Island	1,000
Quartz (microcrystalline)		do.	Adamas, Milos Island	150
Steel, crude		Halyvourgia Thessalias S.A. (Manessis Bros. and Voyatzis S.A., 65%, and National Investment Bank for Industrial Development, 35%)	Steelworks at Volos	1,500
Do.		Sidenor Steel Products Manufacturing S.A.	Steelworks at Thessaaloniki and Almyros	2,800
Do.		Halyvourgiki, Inc.	Steelworks at Eleusis	1,200
Do.		Hellenic Steel Co.	Steelworks at Thessaloniki	1,000
Do.		Corinth Pipeworks S.A (CPW)	Steelworks at Thisvi	700
Zeolite		S&B Industrial Minerals, S.A. (Eliopoulos - Kyriakopoulos Group)	Mine at Pendalofos; plant at Ritsona	100
Zinc, mine, Zn in concentrate		Hellas Gold S.A. (European Goldfields Ltd.)	Kassandra Mines [Olympias (closed) and Stratoni], northeastern Chalkidike	30

Do., do. Ditto. NA Not available.

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THE MINERAL INDUSTRY OF HUNGARY

By Mark Brininstool

Hungary was a modest producer of minerals, and mining and mineral processing activities made up only a small part of the country's economy. In 2009, Hungary's gross domestic product (GDP) decreased by 6.3% compared with the GDP in 2008. Mining and quarrying made up only about 0.2% of the GDP in 2008 (the latest year for which data were available). Petroleum, petroleum products, and related materials accounted for about 5% of the value of all imports, and natural and manufactured gas accounted for about 4% of the total value of imports. Hungary was a participant in both the South Stream and the Nabucco natural gas pipeline development projects (Hungarian Central Statistical Office, 2009; 2010a, p. 12-13; b, p. 42).

Production

Production decreases were seen for most minerals in 2009 owing to the world economic crisis and the resulting decrease in demand for mineral commodities. Production of bauxite and alumina decreased by 38% each; gallium, by 33%; pig iron, by 19%; crude steel, by 35%; and steel semimanufactures, by an estimated 36%. Production stopped at Hungary's second ranked steel producer, Dam 2004 Acel-es Hengermu Kereskedemi es Szolgaltoto Ltd. (Dam 2004), in December 2008, and the liquidation process for Dam 2004's assets began in June 2009. In April, steel producer ISD Dunaferr Ltd. announced that it would lay off 300 employees and release 100 workers into early retirement. ISD Danaferr's subsidiary ISD Kokszolo Ltd. reduced coke production by 25% (ISD Dunaferr Ltd., 2009; Steel Guru, 2009).

Industrial mineral production was estimated to have declined in 2009 owing to the 4.3% decrease in the volume of construction compared with that of 2008. Building construction decreased by 12.6%, but civil construction increased by 6.2%. In the third quarter of 2009, Holcim Hungaria Zrt. stopped production at its cement plant at Labatlan owing to decreased demand for cement. Nostra Cement, which was a subsidiary of Strabag SE, expected to complete construction on a new cement plant at Kiralyegyhaza with a production capacity of 750,000 to 850,000 t/yr of cement in the summer of 2010 and to begin production in 2011 (Budapest Business Journal, 2009; Holcim Ltd., 2009; Hungarian Central Statistical Office, 2010b, p. 51).

Structure of the Mineral Industry

Table 2 is a list of the major mineral industry facilities. Four important changes were made to table 2. The Tisza and the Zala refineries were removed from the list of petroleum refineries because these refineries did not distill any crude oil. The Tisza refinery performed desulfurization and fuel blending and the Zala refinery produced bitumen products. Motim Electrocorundum Ltd. was removed from the list of alumina producers because the company produced alumina products and not alumina from bauxite. INOTAL Aluminium Processing Ltd. was removed from the list of aluminum producers. Since it took over the smelter at Inota from Magyar Aluminium Ltd. (MAL) in 2007, INOTAL produced only aluminum products and not crude aluminum.

Outlook

Hungary will most likely remain a small producer of mineral products and the trade of mineral fuels was expected to remain a significant issue in terms of Hungary's trade balance.

References Cited

Budapest Business Journal, 2009, Strabag to complete HUF 50 billion cement plant in Hungary in 2010: Budapest Business Journal, September 3. (Accessed August 26, 2010, at http://bbjonline.hu/index.php?id=49990.)

Holcim Ltd., 2009, Media release—Third quarter 2009: Holcim Ltd. press release, November 11. (Accessed August 26, 2010, at http://www.holcim.com/CORP/EN/id/1610649146/mod/6_1/page/news.html.)

Hungarian Central Statistical Office, 2009, Gross domestic product, 2008 (preliminary estimation): Hungarian Central Statistical Office, September, 29 p. (Accessed November 12, 2009, at http://portal.ksh.hu/pls/ksh/docs/hun/xftp/idoszaki/gdpev/egdpevelo08.pdf.)

Hungarian Central Statistical Office, 2010a, External trade—Detailed results, January-December 2009: Hungarian Central Statistical Office, March 4, 20 p. (Accessed August 27, 2009, at http://portal.ksh.hu/pls/ksh/docs/eng/xftp/gyor/kul/ekul20912.pdf.)

Hungarian Central Statistical Office, 2010b, Hungary in figures 2009: Budapest, Hungary, Hungarian Central Statistical Office, August, 59 p.

ISD Dunaferr Ltd., 2009, Extreme steel industry environment forces ISD Dunaferr to rationalize workforce in an effort to save company: ISD Dunaferr Ltd. press release, April 15. (Accessed April 21, 2009, at http://www.dunaferr.hu/english/08-media/news20090415.html.)

Steel Guru, 2009, Bidder for bankrupt NE Hungary steel giant identified: Steel Guru, September 17. (Accessed August 26, 2010, at http://www.steelguru.com/international_news/Bidder_for_bankrupt_NE_Hungary_steel_giant_identified/112161.html.)

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TABLE 1

HUNGARY: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007	2008	2009
METALS						
Bauxite, gross weight	thousand metric tons	535	538	546	511	317
Alumina, gross weight, calcined basis	do.	305	301	301	299	185
Aluminum:						
Primary		31,800	1,400	--	--	--
Secondary[e]		50,000	50,000	50,000	50,000	50,000
Total		81,800	51,400	50,000	50,000	50,000
Gallium	kilograms	5,900 [r]	6,300 [r]	5,600 [r]	5,100 [r]	3,400
Iron and steel, metal:						
Pig iron	thousand metric tons	1,329	1,335	1,394	1,289	1,050
Steel:						
Crude	do.	2,005	2,144	2,317	2,160	1,401
Semimanufactures	do.	1,944 [r]	2,225 [r]	2,138 [r]	2,196 [r]	1,400 [e]
Manganese ore:						
Run-of-mine:						
Gross weight		50,000	50,000	51,000	50,000	50,000 [e]
Mn content[e]		13,500	13,400	13,600	13,400	13,400 [e]
Concentrate:[e]						
Gross weight		15,000	15,000	15,000	15,000	15,000
Mn content		5,000	5,000	5,000	5,000	5,000
INDUSTRIAL MINERALS						
Cement, hydraulic	thousand metric tons	3,371	3,724	3,552	3,544	3,200 [e]
Clays:						
Bentonite, raw		9,000	6,600	54,000	50,000	45,000 [e]
Kaolin, raw and washed		7,000	7,000	3,000	3,000	2,800 [e]
Gypsum and anhydrite		55,000	30,000	26,000	26,000	24,000 [e]
Nitrogen, N content of ammonia[e]	thousand metric tons	275	275	300	300	300
Perlite		65,000	71,000	67,000	67,000	65,000 [e]
Sand and gravel:						
Gravel	thousand metric tons	33,500	34,483	29,400	25,000	23,000 [e]
Sand:						
Common	do.	12,800	11,634	5,400	5,400	5,000 [e]
Foundry		138,000	120,000	117,000	100,000	90,000 [e]
Glass		164,000	251,000	220,000	220,000	200,000 [e]
Stone:						
Dimension, all types[e]	thousand metric tons	5,000	5,000	5,745 [3,r]	5,700 [3,r]	5,500
Dolomite	do.	7,200 [e]	8,142	6,270	6,200	6,000 [e]
Limestone	do.	3,014	3,517	3,287	3,200	3,000 [e]
Sulfur, byproduct, elemental, all sources[e]		65,000	50,000	65,000	65,000	60,000 [e]
Sulfuric acid[e]		80,000	80,000	80,000	80,000	75,000 [e]
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Bituminous	thousand metric tons	--	--	--	--	--
Brown	do.	1,426	1,352	1,392	1,373	1,370 [e]
Lignite	do.	8,154	8,467	8,352	8,041	8,000
Total	do.	9,580	9,819	9,744	9,414	9,370 [e]
Coke, metallurgical		613,643	921,062	1,016,547	998,809	746,155
Gas, natural	million cubic meters	3,159	3,246	2,653	2,691 [r]	2,517
Peat		NA	77,300	89,000 [r]	90,000	90,000 [e]

See footnotes at end of table.

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TABLE 1—Continued

HUNGARY: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007	2008	2009
MINERAL FUELS AND RELATED MATERIALS—Continued						
Petroleum:[e, 4]						
Crude	thousand 42-gallon barrels	6,340	5,930	5,610	5,180	4,970
Refinery:						
Motor fuel (including aviation fuel)	do.	11,300	11,700	11,900	11,600	11,100
Gas oil	do.	27,100	26,900	28,800	28,900	28,600
Fuel oil	do.	1,200	1,800	1,000	900	900
Total	do.	39,600 r	40,400 r	41,700 r	41,400 r	40,600

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. do. Ditto. NA Not available. -- Zero.

[1]Table includes data available through August 27, 2010.

[2]In addition to the commodities listed, diatomite, lime, and a variety of industrial minerals and construction materials, such as common clay and talc, may have been produced, but available information is inadequate to make reliable estimates of output.

[3]Reported figure.

[4]Figures were converted to barrels from production reported in thousand metric tons, which was reported as the following: Crude production: 2005—948; 2006—886; 2007—839; 2008—775; 2009—743. Petroleum products (totals): 2005—4,998; 2006—5,092; 2007—5,249; 2008—5,225; 2009—estimated by author.

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TABLE 2
HUNGARY: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity holders	Location of main facilities	Annual capacity
Alumina		Magyar Aluminium Ltd. (MAL)	Ajka Timfoldgyar plant, about 120 kilometers southwest of Budapest, near Lake Balaton	400
Bauxite		do.	Bakony bauxite mine 5 kilometers south of Ajka	NA
Cement		Holcim Hungaria Zrt. (Holcim Ltd.)[1]	Plants at Labatlan and Hejocsaba	2,100
Do.		Duna-Drava Cement Kft. (HeidelbergCement, 50%, and Schwenk Zement KG, 50%)	Plants at Beremend, 30 kilometers south of Pecs, and Vac, 35 kilometers north of Budapest	2,500
Clays		Agyag-Asvany Kft	Two opencast mines at Felsopeteny	NA
Coal:				
Brown coal		Vertes Power Plant Ltd. (Magyar Villamos Muvek Zrt., 96.59%)	Markushegy Mine at Oroszlany, 55 kilometers west of Budapest	1,400 e
Lignite		Mátrai Erömü Zrt. (MÁTRA) (RWE AG, 50.9%; Magyar Villamos Muvek Zrt., 25.5%; EnBW AG, 21.7%)	Thorez opencast mine at Visonta, 80 kilometers northeast of Budapest	4,700 e
Do.		do.	Opencast mine at Bukkabrany, 130 kilometers northeast of Budapest	4,000 e
Coke		ISD Kokszolo Ltd. (ISD Dunaferr Co. Ltd.)	Dunaujvaros, 60 kilometers south of Budapest	1,000
Iron, pig iron		ISD Dunaferr Co. Ltd. (Industrial Union of Donbass)	do.	1,400
Manganese		NA	Urkut manganese ore mines, 120 kilometers southwest of Budapest	NA
Natural gas		Hungarian Oil and Gas Co. (MOL)	Oil and gas fields in south and southwest Hungary	NA
Perlite		Perlit 92 Kft	Palhaza, northeastern Hungary; opencast mine and processing plant	NA
Petroleum:				
Crude	42-gallon barrels per day	Hungarian Oil and Gas Co. (MOL)	Oil and gas fields in southern and southwestern Hungary	14,800 e
Refined		Duna Refinery [Hungarian Oil and Gas Co. (MOL)]	Szazhalombatta, 25 kilometers southwest of Budapest	8,100
Pig iron		ISD Dunaferr Co. Ltd. (Industrial Union of Donbass)	Dunaujvaros, 60 kilometers south of Budapest	1,300
Silica		Uveg-Asvany Banyaszati Ipari Kft.	Mine and plant at Fehevaresugo	NA
Steel, crude:				
Primary		ISD Dunaferr Co. Ltd. (Industrial Union of Donbass)	Dunaujvaros, 60 kilometers south of Budapest	1,600
Secondary		OAM OZD Steelworks Ltd.	120 kilometers northeast of Budapest	360
Do.		Dam 2004 Acel-es Hengermu Kereskedemi es Szolgaltato Ltd.[2]	Diosgyor, 145 kilometers northeast of Budapest	550

eEstimated. Do., do. Ditto. NA, Not available.
[1]Holcim Hungaria Zrt.'s plant at Labatlan temporarily halted cement production in the third quarter of 2009.
[2]Stopped production in December 2008.

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The Mineral Industry of Iceland

By Harold R. Newman

Iceland has abundant renewable energy resources. Its policy was to make the fullest use of these resources in a sustainable manner. Nearly all Iceland's electricity and heating was provided by renewable resources, mainly hydropower and geothermal energy, of which geothermal energy was the most significant (Iceland Adventure, 2009).

The economy of Iceland is diversified, but it is subject to high volatility. Iceland experienced its deepest and most rapid financial crisis recorded since World War II when the top three commercial banks—Glitnirbanki hf., Kaupthing Bank hf., and Landshanki hf.—failed in October 2008. The financial system collapsed, the major banks were nationalized, and the stock market closed. Iceland requested assistance from the International Monetary Fund (IMF). In 2009, the Executive Board of the IMF approved a loan package subject to the Government following a proposed economic recovery program that would include stabilizing the currency, establishing trust in Iceland's monetary system, revising fiscal policy, and restructuring the banking system. The IMF subsequently disbursed the first tranche of the loans. A second review of the program was scheduled for April 2010 (U.S. Department of State, 2010, p. 5).

The collapse of the financial sector led to a major shift in public opinion in favor of joining the European Union (EU) and adopting the euro because of concerns of the people about losing control of their fishing resources and reactions to measures taken by EU partners following the financial crisis (U.S. Central Intelligence Agency, 2009).

The aluminum and ferroalloy industries in Iceland used substantial amounts of energy. The country's aluminum plants and ferroalloy plant relied on imported raw materials and inexpensive geothermal and hydroelectric energy. Iceland accounted for about 2% of the global production of primary aluminum and about 1.5% of the world's ferrosilicon production (Bray, 2010; Corathers, 2010).

Iceland's economy was heavily dependent on its export sector and on its imports to meet domestic demand for mineral commodities. Aluminum was the country's leading export commodity followed by ferrosilicon. Because of the country's geographic proximity to the EU and membership in the European Free Trade Association, most of Iceland's trade was with Europe (U.S. Department of State, 2010, p. 6).

In 2009, the total value of exported goods was $349.5 million. The total value of imported goods was $179.1 million. U.S. exports to Iceland included fuel oil, $34.8 million; petroleum products, $18.4 million; metallurgical-grade coal, $6.6 million; and iron and steel products, $263,000. U.S. imports from Iceland included gem diamond (uncut or unset), $181 million; iron and advanced steel manufactures, $89 million; and iron and steel products, $15 million (U.S. Census Bureau, 2009).

Production

Production of aluminum using mainly imported materials had risen significantly in 2008 with the startup of Alcoa's new smelter and increased slightly in 2009. Iceland has few proven mineral resources and metals were not available in sufficient quantities to make mining feasible with existing technology. Production of industrial minerals included cement, crushed stone, pumice, salt, sand and gravel, and scoria. Diatomite production ceased in 2006. All production of industrial minerals was used by local industries (table 1).

Structure of the Mineral Industry

The majority of the shares of the major mineral enterprises, except for aluminum producers, were held by the Government. The remaining mineral enterprises were either foreign-owned and locally operated, or, in the case of small mineral-related businesses, locally owned and operated (table 2).

Commodity Review

Metals

Aluminum.—Alcoa Inc.'s Fjaröaál smelter at Reydarfjordur started production in 2008. The project was Alcoa's first new primary aluminum smelter in 20 years and the smelter had a production capacity of 347,000 metric tons per year (t/yr). The Alcoa smelter at Fjaröaál exported about $600 million worth of aluminum alloys, aluminum rod, and pure aluminum in 2009 (Alcoa Inc., 2009).

Century Aluminum Co. of Switzerland announced that it would restart construction in 2009 at its proposed aluminum smelter in Helguvik. Plans for the smelter were put on hold in 2008 owing to tightened credit markets, the collapse of Iceland's economy, and the market downturn in the aluminum industry. Century planned to expand the smelter's capacity to 360,000 t/yr from its previous target of 250,000 t/yr (Metal Bulletin, 2009).

Mineral Fuels

Petroleum.—The global financial crisis dealt a blow to the Government's plans to offer areas for exploration and production because all the players bidding in its debut round withdrew their applications. Lindir hf of Iceland and Sagex Petroleum ASA of Norway, which had submitted a joint bid, bowed out of the process. Sagex stated that, as a small company, it could not afford to bear the full costs and risks of exploration in a frontier region on its own. Aker Exploration ASA withdrew earlier in 2009, saying the move was prompted by a change in exploration strategy and its merger with Det Norske Ojeselskap ASA. Because there were no bidders, the National Energy Authority did not issue a license for the first licensing round (Upstreamonline, 2009).

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Outlook

Iceland's financial problems are expected to continue through 2011. Aluminum and ferroalloy production are likely to continue to dominate the mineral resource sector. Petroleum exploration is expected to resume offshore Iceland after the country's recovery from the financial crisis.

References Cited

Alcoa Inc., 2009, Alcoa Fjaröaál exported goods for $600 thousand dollars in 2009: Alcoa Inc. (Accessed March 11, 2010, at http://www.alcoa.com/iceland/en/news/whats_new.asp.)

Bray, E.L., 2010, Aluminum: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 16-17.

Corathers, L.A., 2010, Silicon: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 144-145.

Iceland Adventure, 2009, Geothermal energy: Iceland Adventure. (Accessed December 10, 2010, at http://iceland.ednet.ns.ca/schedule.htm.)

Metal Bulletin, 2009, Century will restart aluminium plant construction in Iceland: Metal Bulletin, no. 9109, August, p. 6.

Upstreamonline, 2009, Cash crunch ruins Iceland's hopes for exploration and production: Alexander's Gas & Oil Connections. (Accessed November 23, 2009, at http://www.gasandoil.com/goc/news/nte94487.htm.)

U.S. Census Bureau, 2009, Foreign trade: U.S. Census Bureau. (Accessed March 11, 2010, at http://www.census.gov/foreign-trade/balance/c4000.html.)

U.S. Central Intelligence Agency, 2009, Iceland, *in* The world factbook: U.S. Central Intelligence Agency. (Accessed December 23, 2010, at http://www.cia.gov/library/publications/the-world-factbook/geos/ic.html.)

U.S. Department of State, 2010, Iceland: U.S. Department of State background note, 9 p. (Accessed December 10, 2010, at http://www.state.gov/r/pa/ei/bgn/3396.htm.)

TABLE 1
ICELAND: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2005	2006	2007[e]	2008	2009[e]
Aluminum, metal, primary[2]		273,318	328,424	446,297 [r, 3]	761,204 [r, 3]	785,000
Cement, hydraulic[4]		132,438	141,433	140,000	138,000 [r]	138,000
Diatomite		3,236	--	--	--	--
Ferrosilicon		114,844	113,798	114,000	112,000	81,000
Pumice and related volcanic material:						
Pumice		105,454	92,663	95,000	95,000 [e]	95,000
Scoria[e]		1,000	1,000	1,000	1,000	1,000
Salt[e]		4,600	4,500	4,500	4,500	4,500
Sand:[e]						
Basaltic	cubic meters	1,300	1,200	1,200	1,000	1,000
Calcareous, shell	do.	80,000	75,000	75,000	70,000	70,000
Sand and gravel	thousand cubic meters	4,300	4,200	4,200	4,000	4,000
Silica dust[5]		22,992	24,955	25,000	24,000	24,000
Stone, crushed:[e]						
Basaltic		97,000	95,000	95,000	95,000	90,000
Rhyolite	cubic meters	19,000	18,000	18,000	18,000	16,000

[e]Estimated; estimated data are rounded to no more than three significant digits. [r]Revised do. Ditto. -- Zero.

[1]Table includes data available through April 30, 2010.

[2]Ingot and rolling billet production.

[3]Reported figure.

[4]Sales.

[5]Byproduct of ferrosilicon.

TABLE 2
ICELAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum	Alcoa Inc.	Fjaröaál at Reydarfjordur	347
Do.	Icelandic Aluminium (ISAL)	Straumsvik	190
Do.	Century Aluminum Co.	Grundartangi	260
Cement	Sementsverksmidja Rikisins (Government, 100%)	Akranes	115
Diatomite	Kisilidjan hf [Diatomite Plant Ltd.] (Government, 98%)	Myvatnssveit (closed)	27
Ferrosilicon	Elkem Iceland (Elkem A/S)	Plant at Grundartangi	100
Fertilizer	Aburdarverksmidja Rikisins (Government, 100%)	Gufunes	60
Pumice	Hekla Pumice Co.	Mount Hekla	210
Do.	Pumice Products Ltd. (BM Valla Ltd., 100%)	do.	32
Salt	Icelandic Salt Co. (Akzo Nobel NV, 58%)	Plant at Svartsengi	5

Do., do. Ditto.

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The Mineral Industry of Ireland

By Alberto Alexander Perez

In 2009, Ireland experienced a major economic recession that affected all industries and services in the country. The gross domestic product (GDP) was $186.7 billion based on purchasing power parity, which was a decrease of almost 8% compared with that of 2008. Forecasts for 2010 did not indicate a recovery, as the International Monetary Fund estimated a further decrease of 3% in Ireland's GDP in the year ahead and an unemployment rate of 15.5% in 2010 compared with 11.8% in 2009. The property and construction markets experienced the largest decreases in terms of value and employment loss; however, all parts of the industry and services sectors, including the mineral industry, experienced decreases in growth. The value of Ireland's total exports decreased to $108.6 billion in 2009 from $119.8 billion in 2008. The decrease in exports was probably linked to the world economic slowdown, as the country's principal trading partners also experienced an economic downturn in 2009. Ireland's main export partners, in terms of their share of the total value of all Ireland's exports, were the United States (20.5%), Belgium (17.8%), the United Kingdom (16.3%), Germany (5.7%), France (5.6%), and Spain (4.2%). Ireland is part of the European Union (EU), and more than 50% of the country's exports went to countries belonging to the EU. More than 53% of Ireland's imports, in terms of value, originated in the EU. The United States was the major non-EU exporter of goods and services into Ireland and provided 16.9% of Ireland's imports, in terms of value. Ireland also is part of the European Monetary Union, and, consequently, its official currency is the euro (€) (Monaghan, 2009; U.S. Central Intelligence Agency, 2010).

Minerals in the National Economy

In 2009, exports remained a small component of Ireland's GDP. Minerals accounted for about 1% of its exports. Mining accounted for about 1% of the GDP, and an estimated 1,000 people were directly employed in the mining industry (Department of Communications, Energy and Natural Resources, 2009, p. 23; U.S. Central Intelligence Agency, 2010).

Production

In 2008 (the latest year for which data were available), Ireland produced 36% of the EU's zinc mine production, making it the leading producer, by volume, in the EU and the 10th ranked world producer, by volume. Ireland also produced 15% of the EU's lead mine production in 2008, making it the 3d ranked producer in the EU, by volume, and the 11th ranked producer in the world, by volume. Ireland's zinc and lead production, however, decreased by 9.1% and 14.3%, respectively, in 2009. The five operating mines in Ireland were, in order of the value of output, the Tara Mine in Navan, Co. Meath, the Lisheen lead and zinc mine in Co. Tipperary, the Drummond and the Knocknacran gypsum mines in Co. Monaghan, and the Maddoxtown Mine in Co. Kilkenny. The Tara Mine produced zinc and lead and was the leading zinc producer in the EU; it was owned by Boliden Tara Mines Ltd. (a subsidiary of Boliden AB of Sweden). The Lisheen lead-zinc mine was owned Anglo American plc. The Drummond and the Knocknacran gypsum mines were owned by Irish Gypsum Ltd., which was a subsidiary of the Saint Gobain Group of France. The Maddoxtown Mine, which produced dolomite and limestone, was owned by Roadstone Wood Ltd., which was a wholly owned subsidiary of Cement Roadstone Holdings Plc. (CRH). Lundin Mining Corp.'s Galmoy zinc and lead mine in Co. Kilkenny closed on June 30, 2009, after 12 years of operation. Ireland was one of the world's leading exporters of lead and zinc concentrate. The country also produced alumina and cement in 2009 (table 1; Department of Communications, Energy and Natural Resources, 2009, p. 23; Department of Communications, Energy and Natural Resources, Exploration and Mining Division, 2010).

Structure of the Mineral Industry

Although Ireland was an important world producer of zinc and lead, mining and the mineral-processing industry contributed only a small percentage of the country's GDP. Companies were mostly privately owned. The Exploration and Mining Division of the Department of Communications, Energy and Natural Resources is responsible for both the technical management of the state mineral licensing and leasing system and for promoting the mineral industry. The major mineral industry facilities and their capacities are listed in table 2.

Commodity Review

Metals

Bauxite and Alumina.—United Company RUSAL (RUSAL) of Russia reduced its output of alumina because of high production costs of the company's alumina refinery, which was located on Aughinish Island on the south side of the Shannon estuary near Limerick City and operated by Aughinish Alumina plc. Aughinish Alumina produced about 1.2 million metric tons (Mt) of alumina in 2009, which was a decrease of 34% compared with production in 2008. Alumina is obtained at the plant by treating bauxite ore using the Bayer process. RUSAL stated that, assuming a restoration of the alumina world market, it planned to increase production at the refinery on Aughinish Island (United Company RUSAL, 2010).

Lead and Zinc.—Underground operations were terminated at Lundin Mining's Galmoy Mine in May, and milling operations were stopped there in June. The mine was approaching the end of its natural life; however, the collapse in base-metal prices in 2008 pushed forward the closure of the mine. Although the tonnage of ore mined and milled in 2009 was significantly lower than in 2008, base-metal production

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was actually greater because the mine worked higher grades (Department of Communications, Energy and Natural Resources, Exploration and Mining Division, 2010, p. 2).

Boliden's Tara Mine operation in Navan, Co. Meath, continued to be the leading zinc mine in Europe. In 2009, it milled 2.51 Mt of ore grading 7.91% zinc and 1.52% lead. This ore yielded more than 185,000 metric tons (t) of zinc and 23,000 t of lead metal in concentrate. The mine's Joint Ore Reserves Committee (JORC)-classified ore reserves (proven and probable) were 17 Mt grading 7.2% zinc and 1.8% lead. At the end of the year, the mine assembled and commissioned a new autogenous mill. Boliden hoped that this investment would increase yields and reduce surface processing costs (Department of Communications, Energy and Natural Resources, Exploration and Mining Division, 2010, p. 1).

Anglo American produced 1.53 Mt of ore grading 12.43% zinc and 1.84% lead from its mine at Lisheen, Co. Tipperary. The ore yielded concentrates in the amount of 172,000 t of zinc and 19,000 t of lead metal in concentrate.

In 2009, Xstrata Zinc, which was a unit of Xstrata plc of Switzerland, and joint-venture partner Minco plc continued exploration at Pallas Green in northeast Co. Limerick. Teck Ireland Ltd. and its joint-venture partner Connemara Mining Company Plc. were exploring for lead and zinc at their Stonepark project in Stonepark North, Co. Limerick. Belmore Resources Ltd. announced in February that the company had entered into a joint-venture agreement with Lindin Mining Exploration Ltd. to explore Belmore's 11 prospecting licenses in Co. Clare (Department of Communications, Energy and Natural Resources, Exploration and Mining Division, 2010, p. 1, 2, 4).

Industrial Minerals

Dolomite and Limestone.—Roadstone Wood Ltd. (formerly Roadstone Provinces Ltd.), which was a subsidiary of Group CRH Plc, produced dolomite and limestone from an open pit mine at Maddoxtown, near Bennettsbridge in Co. Kilkenny. The material was processed onsite and used as aggregate by the construction industry (Department of Communications, Energy and Natural Resources, Exploration and Mining Division, 2010, p. 2).

Gypsum.—Irish Gypsum Ltd., which was a subsidiary of the Saint Gobain Group, extracted gypsum from two sites in southern Co. Monaghan. An estimated 400,000 t was produced from an opencast operation in Knocknacran and the adjoining underground mine at Drummond; this amount of production was considerably less than the 600,000 t produced in 2008. The collapse of the construction market in Ireland seems to have been a leading cause for the decrease in production. The gypsum was crushed and blended locally and then supplied to Irish Gypsum's plaster mill and plaster board plant in Kingscourt. Additional material was supplied to the Irish agricultural and cement industries (Department of Communications, Energy and Natural Resources, Exploration and Mining Division, 2010, p. 2).

Mineral Fuels

Exploration offshore Ireland has never received the same level of interest as offshore Norway or the United Kingdom, despite similarities of geology. In the past, offshore oil exploration has not been particularly successful.

Natural Gas and Petroleum.—In September 2009, Serica Energy plc of the United Kingdom encountered petroleum at its drilling operations on the Bandon offshore exploration well in the Slyne Basin, west of Ireland. Samples were taken for analysis, and the company stated that, although it was not clear if the oil accumulation was feasible for commercialization, the discovery seemed to be encouraging for future exploration (Serica Energy plc, 2010).

Marathon Oil Corp. of the United States announced in June that it had entered into a definitive agreement with Vermillion Energy Trust under which Vermillion would acquire Marathon's wholly owned subsidiary Marathon International Petroleum Hibernia Ltd., which held Marathon's 18.5% interest in the Corrib natural gas development offshore Ireland. Marathon Oil Ireland Ltd., which was Marathon's Irish oil and gas exploration and production business, would be reported as a discontinued operation in Marathon's consolidated financial statements (Marathon Oil Corp., 2009).

Outlook

Ireland is likely to remain a major EU producer of zinc ore and an important producer of alumina and lead ore. Exploration activity for additional new mineral resources, with the main emphasis on gold, lead, and zinc, is expected to continue.

The economic recession that hit Ireland affected all aspects of the economy dramatically. The financial problems, particularly in the failed Irish banking and construction sectors, are expected to continue to affect Irish industry across the board, in particular in the areas of investment and production. Although the Government's economic reactivation plans seem to target all aspects of the Irish economy, it is unclear what would be the net effect for the mining industry.

Oil and gas exploration and further development of the energy sector and renewable energy will likely become a priority as interest in exploring for petroleum and gas off the shores of Ireland increases.

References Cited

Department of Communications, Energy and Natural Resources, 2009, State mining and prospecting facilities—Prospecting license competition and industry news: Dublin, Ireland, Department of Communications, Energy and Natural Resources, May 33 p.

Department of Communications, Energy and Natural Resources, Exploration and Mining Division, 2010, Exploration and mining industry news as at 1st February 2010: Dublin, Ireland, Department of Communications, Energy and Natural Resources, 8 p. (Accessed September 18, 2010, at http://www.mineralsireland.ie/NR/rdonlyres/380A1A42-E82F-4AF0-A36D-23667B1D5469/0/Industry_News_publication_Feb2010.pdf.)

Marathon Oil Corp., 2009, Marathon Oil Corporation announces sale of its interest in Corrib Development in Ireland: Marathon Oil Corp., June 24. (Accessed August 30, 2010, at http://www.marathon.com/News Press_Releases/Press_Release/?id=1301886.)

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Monaghan, Angela, 2009, Irish economy is worst hit by downturn, IMF claims: The Telegraph [London, United Kingdom], June 25. (Accessed September 17, 2010, at http://www.telegraph.co.uk/finance/economics/5638961/Irish-economy-is-worst-hit-by-downturn-IMF-claims.html.)
Serica Energy plc, 2010, Blocks 27/4, 27/9 and part Block 27/5–Slyne Basin: Serica Energy plc. (Accessed September 12, 2010, at http://www.serica-energy.com/operations-ireland-block27.php.)
United Company RUSAL, 2010, RUSAL announces full year production results for 2009: United Company RUSAL, February 24. (Accessed September 21, 2010, at http://www.rusal.ru/en/news_details.aspx?id=6681.)
U.S. Central Intelligence Agency, 2010, Ireland, *in* The world factbook: U.S. Central Intelligence Agency. (Accessed August 15, 2010, at https://www.cia.gov/library/publications/the-world-factbook/geos/ei.html.)

TABLE 1
IRELAND: PRODUCTION OF MINERAL COMMODITIES[1]

(Thousand metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008	2009[e]
METALS						
Alumina[e]		1,500	1,800	1,800	1,890 [r]	1,240 [2]
Lead:						
Mine output, Pb content	metric tons	63,810	61,800	54,100	50,200	43,000 [2]
Metal, refined, secondary[e]	do.	19,992 [2]	21,700 [2]	22,500	20,000	19,000
Silver, mine output, Ag content	kilograms	6,000	4,100	4,000 [e]	8,462 [r]	8,000
Zinc, mine output, Zn content	metric tons	428,596	425,756	400,898	398,200	357,000 [2]
INDUSTRIAL MINERALS[3]						
Cement, hydraulic		5,083 [r]	4,981 [r]	5,000 [r]	3,900 [r,e]	2,600
Gypsum[e]		500	700	700	600 [r]	400
Lime[e]		300	300	300	300	300
Sand and gravel:[e, 4]		12,000	12,000	12,000	25,000	20,000
Stone and other quarry products:[e]						
Limestone	million metric tons	1	1	1	1	1
Other[5]	metric tons	36,000	36,000 [r]	36,000 [r]	60,000 [r]	45,000
MINERAL FUELS AND RELATED MATERIALS						
Gas, natural, marketed[e]	million cubic meters	570	535	566 [2]	502 [2]	413 [2]
Peat:[e, 6]						
For horticultural use		475 [2]	500	500	500	500
For fuel use, milled peat[7]		4,100 [2]	3,800 [2]	3,800	3,800	3,800
Total		4,575 [2]	4,300	4,300	4,300	4,300
Briquets		275 [2]	260 [2]	300	300	300
Petroleum refinery products:[8]						
Liquefied petroleum gas	thousand 42-gallon barrels	672 [r]	593 [r]	405 [r]	387 [r]	380
Naphtha[e]	do.	900	900	900	900	900
Gasoline, motor	do.	5,781 [r]	5,365 [r]	4,987 [r]	4,797 [r]	4,800
Distillate fuel oil	do.	8,182 [r]	8,370 [r]	8,989 [r]	8,726 [r]	8,700
Residual fuel oil	do.	6,800 [r]	7,102 [r]	8,070 [r]	7,469 [r]	7,400
Refinery fuel and losses	do.	828 [r]	821 [r]	798 [r]	872 [r]	870
Total[e]	do.	23,200 [r]	23,200 [r]	24,100 [r]	23,200 [r]	23,100

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. do. Ditto.
[1]Table includes data available through October 1, 2010.
[2]Reported figure.
[3]Ireland also produces significant quantities of synthetic diamond and is the major supplier to the United States. Output, however, is not quantitatively reported, and general information is inadequate to make reliable estimates of output.
[4]Excludes output by local authorities and road contractors.
[5]Includes clays for cement production, fire clay, granite, marble, rock sand, silica rock, and slate.
[6]Includes production by farmers and by the Bord Na Mona (Government Peat Board).
[7]Includes milled peat used for briquet production.
[8]From imported crude oil.

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TABLE 2
IRELAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facility	Annual capacity
Alumina		Aughinish Alumina plc (United Company RUSAL)	Aughinish Island, Co. Limerick	1,800
Cement		Irish Cement Ltd.	Plants in Co. Limerick and Platin	2,000
Lead-zinc, concentrate		Anglo American plc	Lisheen Mine, Co. Kilkenny	160
Do.		Boliden AB	Tara Mine, Navan, Co. Meath	215
Natural gas	million cubic meters	Star Energy Group plc. [Petroliam Nasional Berhad (PETRONAS) 100%]	Kinsale Head Field, Celtic Sea	2,100
Nitrogen, N content of ammonia		Irish Fertilizer Industries	Plant at Marino Point	450
Peat		Bord Na Mona (Government Peat Board)	Production mainly in the Midlands	4,200
Petroleum, refined	42-gallon barrels per day	ConocoPhillips Whitegate refinery Limited	Whitegate, near Cork	71,000

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THE MINERAL INDUSTRY OF ITALY

By Alberto Alexander Perez

In 2009, Italy's gross domestic product (GDP) based on purchasing power parity amounted to an estimated $1.739 trillion, which was a decrease of 5.07% compared with that of 2008. In terms of its GDP based on purchasing power parity, the country ranked fourth in the European Union (EU) after Germany, the United Kingdom, and France. Italy's industrial sector accounted for about 25% of the GDP in 2009, which was a 0.7% decrease from that of the previous year. Industrial output as a whole decreased by 13.5% compared with output in 2008 owing to the effect of the world economic recession on its industries across the board. Italy's most important industrial facilities, in terms of value, are those for the production of aluminum, chemicals, and iron and steel; automotive assembly; machine tooling; and metal working. These sectors continued to be heavily dependent on imported nonfuel and fuel mineral commodities. Italy is also well known for its industrial mineral resources. Its Carrara and Sienese marbles are appreciated for their natural qualities; the production of clays is extensive, and Italy was the 16th ranked manufacturer of cement in the world, measured by volume of production. Italy has gone through an economic development phase similar to those of France, Germany, and the United Kingdom, however, and has become mostly a services-based economy, which has led to specialization in its manufacturing and mineral industries. In 1970, industry's share of the GDP was 30% whereas that of services was 51.9%. In 2009, industry accounted for only 18.8% of the GDP and services accounted for 73.1% of the GDP. In 2009, Italy's national aggregate consumption fell slightly by .5%, reflecting the contraction in Italy's GDP (Cembureau, 2010, p. 4; Istituto Nazionale di Statistica, 2010, p. 21-25; U.S. Central Intelligence Agency, 2010).

Minerals in the National Economy

Italy's mineral industries produced such metals as copper, iron and steel, lead, and zinc, all of which were important materials for the country's manufacturing sector. The raw materials used to produce these and other metals were imported ores and concentrates or were obtained from secondary scrap recovery. Italy was a significant world producer of a variety of industrial minerals, which included cement, clays, feldspar, lime, marble, pumice, and sand and gravel (table 1).

Italy was highly dependent on imported mineral fuels, and Eni S.p.A. (Eni), which was 30% owned by the Italian Government, was the country's leading petroleum and natural gas company. Eni remained among the 20 leading energy companies in the world in 2008, which was the latest year for which data were available (Petroleum Intelligence Weekly, 2010).

Government Policies and Programs

The Government plays a significant role in the economy through regulation of ownership of large financial and industrial companies; privatization and regulatory reform in accordance with EU directives, however, had reduced that role in recent years. Italy's basic mining legislation is mining law No. 1443 of July 29, 1927, which gives subsoil ownership of minerals to the state. The reimbursement of the state by mining concessionaires is regulated by law No. 752 of June 10, 1982. Quarrying operations are regulated by law No. 44 of September 1982.

All petroleum and gas upstream activities are supervised by the Ufficio Nazionale Minerario per gli Idrocarburi e la Geotermia [National Office for Mining, Hydrocarbons, and Geothermal Resources] (UNMIG), which operates within the Ministero dello Sviluppo Economico [Ministry of Economic Development]. After various organizational changes, the seven offices that compose the UNMIG now all operate within the Directorate General for Energy and Mineral Resources. Furthermore, by Presidential Decree in 2007, a committee was set up to carry out the UNMIG's duties. The Committee for Hydrocarbons and Mineral Resources (CIRM) groups together the functions of previous committees and performs technical advisory tasks related to mining, hydrocarbons, and royalties (Ministero dello Sviluppo Economico, 2010).

Environmental issues in Italy were focused on three main problem areas—air pollution from industrial emissions, such as sulfur dioxide; water pollution of coastal and inland rivers from industrial and agricultural effluents; and such natural hazards as avalanches, landslides, land subsidence in Venice, and volcanic eruptions (U.S. Central Intelligence Agency, 2010).

Production

In 2009, the Italian mineral industry reflected the conditions of the global recession by posting severe decreases in the production of most mineral commodities. Pig iron production decreased by 45.1% to 5.69 million metric tons (Mt), alumina production decreased by 43.3%, ferromanganese production decreased by 35.3%, crude steel production decreased by 35.1% to 19.8 Mt, and silicomanganese decreased by 33%. Total aluminum production decreased by 31.5% compared with production in 2008. During the same period, copper production increased by 19.4%.

In the industrial minerals sector, bentonite production fell by 48%, granite production decreased by 31.8%, and estimated cement output decreased by about 15.5% compared with that of 2008. Nitrogen production, however, increased by 400%, and there were also increases in the production of ball clay (81%), salt (58%), common clay (41.4%), and silica sand (41.1%). Among mineral fuels, crude petroleum production decreased by 16.8% to 30,215,000 42-gallon barrels for 2009, and natural gas production decreased by 12.2% (table 1).

Structure of the Mineral Industry

The Italian Government has ultimate control of all the mineral industry in Italy because mineral resources are by law

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the property of the Italian nation. However, private and mixed public and private entities were the principal owners of Italy's mineral industry. Full Government (public) ownership continued mainly in the mineral fuels sector and the Government has a 30% participation in Eni (table 2).

Mineral Trade

Italy's demand for mineral raw materials was met by imports in 2009. The major commercial partners of Italy were, in order of the value of goods imported, Germany, France, China, and the Netherlands and Spain. Italy's principal partners were, in terms of the value of goods exported, Germany, France, the United States, Spain, and the United Kingdom (Istituto Nazionale di Statistica, 2010, p. 25).

In 2009, exports from Italy to other countries in the EU included nonferrous metals[1] valued at $3.7 billion;[2] nonmetallic mineral manufactures, $5.78 billion; metalliferous ores and metal scraps, $458 million; and crude minerals, excluding coal, crude oil, and precious stones, $266 million. Imports by Italy of goods originating from other countries in the EU included manufactured metals valued at $5.51 billion; nonferrous metals, $5.10 billion; and metalliferous ores and metal scrap, $1.73 billion. In contrast, Italy's most valuable mineral industry imports (not including mineral fuels) from a non-EU country were iron and steel, $5.28 billion, and nonferrous metals, $4.19 billion. The leading mineral exports to non-EU countries were iron and steel and manufactured metals, which were valued at $6.36 billion and $6.26 billion, respectively (Eurostat, 2010, p. 106-108, 114-116, 122-124,130-132).

The most significant component of Italy's mineral trade in 2009 was the net imports of mineral fuels; Italy imported 82.09 million metric tons (Mt) of crude petroleum in 2009, which was a decrease of 8% compared with the level of crude petroleum imports in 2008. Of this amount, Italy imported at least 34% from the Commonwealth of Independent States (CIS), principally from, in order of volume, Russia, Azerbaijan, and Kazakhstan. At least 26% of Italian crude petroleum came from Africa; Libya, which was the most important single country supplier of crude petroleum to Italy, provided 25% of Italy's crude petroleum imports; Iraq, 11%; Iran, 7%; Saudi Arabia, 5%; and Norway, 3%; the remaining 14% came from other sources.

Italy continued to be a net importer of petroleum products. In 2009, the country imported 11.27 Mt of petroleum products, which was a decrease of 2.64% compared with imports in the previous year, and it exported 21.4 Mt, which was a decrease of 19.2% compared with exports in the previous year (Eurostat 2010, p. 2-5, 8).

[1]The classifications stated are from the United Nations Statistics Divisions' Standard International Trade Classification, Revision 4 (series M, no. 34, Rev. 4, March 2006).

[2]Where necessary, values have been converted from euro area euros (€) to U.S. dollars (US$) at an average exchange rate of €.719=US$1.00 for 2009.

Commodity Review

Metals

Aluminum and Bauxite and Alumina.—In 2009, Italy's total output of alumina production decreased by 43.3 percent to 752,873 metric tons (t). United Company RUSAL (RUSAL) suspended operations at its Eurallumina facility in Italy owing to the high cost of running the facilities and decreased production by 91% (table 1; United Company RUSAL, 2010).

Primary and secondary aluminum production decreased by 31.6%. Secondary production decreased to 826,977 t. Alcoa Inc. of the United States idled its smelting operations in Italy at Fusima and Portovesme after a ruling by the European Commission, which stated that a portion of the benefit received by Alcoa from the Italian Government based on an electricity tariff must be refunded because it did not comply with EU state aid rules. Alcoa appealed the decision (table 1; Alcoa Inc., 2010). These events had a major effect on Italian production, as the country's chief producers of alumina and primary aluminum were Rio Tinto-Alcoa Italia S.p.A. and Eurallumina S.p.A. (table 2).

Copper.—KME Group S.p.A. (a major European refiner and fabricator of copper headquartered in Florence) conducted its operations in Italy at Barga and at Scrivia under its subsidiary KME Italy S.p.A. Secondary copper and copper semimanufactures were the main commodities produced at these locations (KME Group S.p.A., 2010, p. 4).

Simar S.p.A (Simar), which was a member of the Cordofin Group S.p.A., had a refinery at Porto Marghera, near Venice. It produced mainly copper-zinc-titanium alloys. Simar's main product was known commercially as Zintek, and Simar created a company with the same name to develop and promote this product, although it was produced in Simar's facilities in Porto Marghera (Simar S.p.A., 2010). For its copper production, Italy imported small amounts of copper concentrate and relied mainly on imports of copper metal and scrap recovery.

Iron and Steel.—In 2009, Italy's pig iron production decreased by about 45.1% from that of 2008 to 5.69 million metric tons (Mt). The production of crude steel decreased by about 35.1% to 19.8 Mt compared with production in 2008, which was a contrast to Italy's highest ever production levels of 32 Mt achieved in 2007 (table 1). Italy's apparent consumption of crude steel dropped to 19.5 Mt and ranked the country second in Europe (excluding the CIS) after Germany (World Steel Association, 2010, p. 88).

The international drop in steel demand owing to world economic conditions had a major effect on steel production in Italy. Tenaris S.A. ceased production at its plant for 13 weeks in August and the company expected a decrease in production of at least 60% for the second half of 2009 (Bloomberg L.P., 2009). In December, the chairman of the steel industry organization Federacciai stated that Italy's forecasted production for 2010 would likely decrease by 40% compared with the output in 2009. As the second ranked producer of steel in Europe, Italy's production was sensitive to world and domestic demand (Reuters, 2009).

Lead and Zinc.—In 2008, Italy's mine output of lead remained static whereas that of zinc metal increased to

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an estimated 107,100 t. A minor amount of lead and zinc concentrate was produced in Sardinia. Domestic mine production of lead and zinc was not sufficient to meet demand, and the country imported most of its requirements for lead and zinc concentrates. Glencore International AG of Switzerland remained the country's principal processor (smelter and refinery) of lead and zinc (table 2).

Industrial Minerals

In 2009, Italy remained a leading European and global producer of such industrial minerals as feldspar (24.9% of world output), pumice (15.3%), bentonite (5.4%), gypsum (3.6%), lime (1.8%), and cement (1.5%) (Cordier, 2010; Crangle, 2010a, b; Miller, 2010; van Oss, 2010; Virta, 2010).

Cement.—Italian cement production decreased by 15.5% owing to a decrease in the construction sector, which was driven by a sharp reduction in activity in the residential construction sector. It is unlikely that the residential sector will recover in the short to medium term to lead a recovery in the cement market, which makes public investment the likely source of a revival in this sector (Cembureau, 2010, p. 4, 10). Italcementi S.p.A. resumed production at its Borgo San Dalmazzo plant after it had been converted into a grinding plant (Cemweek, 2009).

Mineral Fuels

Natural Gas and Petroleum.—In 2009, Italy's output of natural gas decreased by 12.2%, and crude petroleum production decreased by 16.8% to 30.2 million barrels compared with production levels in 2008 (table 1). The country was not well endowed with hydrocarbons and imported 82.09 Mt in 2009, which was a decrease of 8% from the previous year (table 1; Kröppl, 2010b).

Po Valley Energy Ltd. (Po Valley) took control of the Castello and the Sillaro gasfields and was expected to produce gas at the end of the year. The Castello field near Milan was calculated to have 6.3 billion cubic feet in reserves, and Po Valley expected it to have a reserve life of 10 to 12 years. Its initial production per day was expected to be 2.7 million cubic feet. Sillaro has a profile of 14 billion cubic feet and is situated near Bologna: initial offtake was expected to be 3.8 million cubic feet when the project comes online (Oilbarrel.com, 2010).

Algeria and Italy agreed to accelerate the construction of the Galsi gas pipeline between Algeria and Italy. The pipeline was set to export 282 billion cubic feet per year of gas to Italy; construction was set to start in 2010. Also, the Italian and Algerian ministers agreed to increase the TransMed pipeline capacity by 247 billion cubic feet per year (Magharebia, 2010).

Outlook

Italy's construction and manufacturing industries suffered from the drop in world demand. As the world economy recovers, production in Italy will likely be reactivated. This is especially the case in the production of aluminum, cement, and steel, which are some of the sectors that have been most affected by the world economic downturn. As one of the largest EU members in terms of population and the size of its industrial sector, Italy is expected to continue to be a major consumer and producer of durable goods and to continue to rely on imported and recycled mineral materials. The country is likely to continue to rely on major imports of mineral fuels, despite increases in domestic production from new deposits coming onstream in the near term.

References Cited

Alcoa Inc., 2010, Alcoa to idle smelting operations in Italy while appealing EC ruling on energy tariff: Alcoa Inc., November 19. (Accessed November 3, 2010, at http://www.alcoa.com/global/en/news/news_detail.asp?pageID=20091119006223en&newsYear=2009.)

Bloomberg L.P., 2009, Tenaris to shut Italian plant in August as production declines: Bloomberg L.P., July 14. (Accessed November 2, 2010, at http://www.bloomberg.co.jp/apps/news?pid=conewsstory&tkr=TEN:IM&sid=agO_qdE9wxCA.)

Cembureau, 2010, Activity report 2009: Brussels, Belgium, Cembureau, 46 p.

Cemweek, 2009, Italcementi converts unit into grinding plant: Cemweek, September 17. (Accessed November 5, 2010, at http://www.cemweek.com/index.php/news/expansions/2456-italcementi-converts-unit-into-grinding-plant.)

Cordier, D.J., 2010, Feldspar: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 54–55.

Crangle, R.D., Jr., 2010a, Gypsum: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 70–71.

Crangle, R.D., Jr., 2010b, Pumice and pumicite: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 124–125.

Eurostat, 2010, External and intra-European Union trade: European Commission Monthly Statistics, issue no. 06/2010, 487 p. (Accessed October 17, 2010, at http://epp.eurostat.ec.europa.eu/portal/page/portal/external_trade/documents/ExtraIntraMonthlyEUTrade_ENVol06-2010.pdf.)

Istituto Nazionale di Statistica, 2010, Italia in cifre 2010: Rome, Italy, Istituto Nazionale di Statistica, 34 p. (Accessed November 4, 2010, at http://www.istat.it/dati/catalogo/20100518_00/italiaincifre2010.pdf.)

KME Group S.p.A., 2010, Annual report 2009—Group profile: Florence, Italy, KME Group S.p.A., 222 p.

Kröppl, Christian, 2010, Statistical aspects of the oil economy in 2009: European Commission, 9 p. (Accessed October 19, 2010, at http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-QA-10-031/EN/KS-QA-10-031-EN.PDF.)

Magharebia, 2010, Algeria, Italy speed up Galsi pipeline project, boost TransMed capacity: Magharebia, June 1. (Accessed November 3, 2010, at http://www.magharebia.com/cocoon/awi/xhtml1/en_GB/features/awi/newsbriefs/general/2009/06/01/newsbrief-05.)

Miller, M.M., 2010, Lime: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 90–91.

Ministero dello Sviluppo Economico, 2010, Decreto del Presidente della Repubblica 14 Maggio 2007, n. 78: Ministero dello Sviluppo Economico. (Accessed November 5, 2010, at http://unmig.sviluppoeconomico.gov.it/unmig/norme/78dpr07.htm.)

Oilbarrel.com, 2010, Po Valley Energy takes control of Castello and Sillaro as it motors towards first gas in October 2009: Oilbarrel.com, July 14. (Accessed November 2, 2010, at http://www.oilbarrel.com/nc/news/display_news/article/po-valley-energy-takes-control-of-castello-and-sillaro-as-it-motors-towards-first-gas-in-october-200/856.html?tx_ttnews5BpS 5D=1246402800&tx_ttnews 5BpL 5D=2678399&tx_ttnews 5Barc 5D=1&cHash=a977c2f1c5.)

Petroleum Intelligence Weekly, 2010, Petroleum Intelligence Weekly ranks world's top 50 oil companies (2010): Petroleum Intelligence Weekly. (Accessed November 3, 2010, at http://www.energyintel.com/documentdetail.asp?document_id=648479.)

Reuters, 2009, Italy 2010 steel output seen down 40 pct vs 09-industry: Thomson Reuters, December 1. (Accessed November 6, 2010, at http://www.reuters.com/article/idUSGEE5B01RV20091201.)

Simar S.p.A., 2010, Company profile: Simar S.p.A. (Accessed November 10, 2010, at http://www.simarzincorame.com/company.htm.)

United Company RUSAL, 2010, RUSAL announces full year production results for 2009: United Company RUSAL, February 24. (Accessed November 4, 2010, at http://www.rusal.ru/en/news_details.aspx?id=6681.)

Digitized by Google

U.S. Central Intelligence Agency, 2010, Italy, *in* The world factbook: U.S. Central Intelligence Agency. (Accessed November 9, 2010, at https://www.cia.gov/library/publications/the-world-factbook/geos/it.html.)
van Oss, H.G., 2010, Cement: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 38–39.
Virta, R.L., 2010, Clays: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 44–45.
World Steel Association, 2010, Steel statistical yearbook 2010: Brussels, Belgium, World Steel Association, 120 p.

TABLE 1
ITALY: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008	2009
METALS						
Aluminum:						
Alumina, calcined basis		1,109,457	1,463,218 r	1,327,364 r	1,327,566 r	752,873
Bauxite[e]		300	--	--	--	--
Metal:						
Primary		192,900	194,200	182,600	188,400	180,000
Secondary[2]		1,120,845 r	1,277,799 r	1,318,884 r	1,282,917 r	826,977
Total		1,313,745	1,471,999	1,501,484	1,471,317	1,006,977
Bismuth, metal[e]		5	5	5	5	5
Copper, metal, refined, all kinds[e]		32,200	36,400 [3]	28,600	24,200	6,500
Iron and steel, metal:						
Pig iron	thousand metric tons	11,423	11,497 r	11,110 r	10,377 r	5,692
Ferroalloys, electric furnace:						
Ferromanganese		9,000 r	4,500 r	4,800 r	8,500 r	5,500
Ferrosilicon[e]		12,000	10,000	10,000	10,000	10,000
Silicomanganese		21,500 r	33,500 r	37,000 r	25,500 r	17,000
Other[e]		10,000	10,000	10,000	10,000	10,000
Total		52,500 r	58,000 r	61,800 r	54,000 r	42,500
Steel, crude	thousand metric tons	29,061	31,624	31,990	30,600	19,848
Lead:						
Mine output, Pb content[e]		800	800	800	800	800
Metal, refined:						
Primary		49,500	34,600	47,800	48,000	4,800 e
Secondary		161,500	155,900	164,000	164,000	164,000 e
Total		211,000	190,500	211,800	212,000	212,000 e
Manganese, mine output, Mn content[e]		-- r	-- r	-- r	-- r	--
Silver, mine output, Ag content[e]	kilograms	100	100	100	100	100
Zinc, metal, primary		121,200	109,200	102,100	107,100 [3]	100,000 e
INDUSTRIAL MINERALS						
Barite		4,722	5,000 e	5,000 e	5,000 e	3,500 e
Bromine[e]		300	300	300	300	300
Cement, hydraulic	thousand metric tons	40,284	43,234	47,541	43,000	36,317
Clays, crude:						
Common clay	do.	3,651	3,937	3,900	4,472 r	6,324
Bentonite	do.	446	470	306 r	281 r	146
Refractory, excluding kaolinitic earth	do.	1,310	1,964	1,960	942 r	844
Ball clay	do.	539	550	635 r	591 r	1,070
Fuller's earth[e]	do.	3	3	3	3	3
Kaolin[e]	do.	250	470	470	470	470
Diatomite[e]		25,000	25,000	25,000	25,000	25,000
Feldspar	thousand metric tons	3,335	4,019	4,727	4,700 e	4,700 e
Fluorspar		15,000	15,000 e	--	--	--
Gypsum	thousand metric tons	2,356	2,860	5,458	5,450 e	5,101
Lime, hydrated, hydraulic, and quicklime[e]	do.	5,894 [3]	5,800	6,000	6,000	6,000
Magnesia	do.	371	348	100 r,e	100 r,e	100 e
Nitrogen, N content of ammonia	do.	525 e	500 e	460 e	460 e	2,321
Perlite[e]		60,000	60,000	60,000	60,000	60,000
Pigments, mineral, iron oxides, natural[e]		500	500	500	500	105 [3]

See footnotes at end of table.

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TABLE 1—Continued

ITALY: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008	2009
INDUSTRIAL MINERALS—Continued						
Pumice and related materials:						
Pumice[e]	thousand metric tons	28 [3]	30	30	30	30
Pozzolan[e]	do.	4,000	4,000	4,000	4,000	4,000
Salt	do.	3,613	3,438	2,214	2,200 [e]	3,471
Sand and gravel	do.	206,149	210,000 [e]	210,000 [e]	210,000	164,218
Silica sand	do.	13,492	14,000 [e]	14,000 [e]	14,000 [e]	19,759
Sodium compounds, n.e.s.:[e, 4]						
Soda ash	do.	525 [3]	500	500	500	500
Sodium sulfate	do.	125	125	125	125	125
Stone:						
Calcareous:						
Alabaster[e]	do.	7,000	7,000	7,000	7,000	7,000
Chalk	do.	312	228	228 [r]	228 [r]	228 [e]
Dolomite	do.	2,092	2,192	1,726	1,700 [e]	1,601
Marble and travertine, crude	do.	5,061	4,687	4,643	4,600 [e]	4,604
Limestone for lime and cement	do.	42,390	41,255	32,953	32,900	41,090
Granite	do.	2,651	1,894	1,477	1,480	1,009
Sandstone	do.	362	397 [r]	397 [r]	397 [r]	451
Slate	do.	138	220	288	288 [r]	52
Crushed and broken[5]	do.	61,640	60,000 [e]	60,000 [e]	60,000 [e]	84,718
Sulfur:[e]						
From metallurgy	do.	92 [3]	90	90	90	90
From hydrocarbons	do.	650	650	650	650	650
Talc and related materials		112,781	146,942	112,080	112,000 [e]	112,000 [e]
MINERAL FUELS AND RELATED MATERIALS						
Asphalt and bituminous rock, natural	thousand metric tons	1,900	1,807	1,810	1,800 [e]	1,030
Coke, metallurgical[e]	do.	4,000	4,000	4,000	4,000	4,000
Gas, natural	million cubic meters	12,062 [r]	10,986 [r]	9,713 [r]	9,260 [r]	8,127
Natural gas liquids[e]	thousand 42-gallon barrels	350	350	350	350	350
Petroleum:						
Crude:	do.	31,110	29,600 [e]	30,012	36,300	30,215
Refinery products	do.	772,169 [r]	748,150 [r]	770,892 [r]	719,499 [r]	700,000 [e]

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. do. Ditto. -- Zero.

[1]Table includes data available through October 30, 2010.

[2]Unwrought aluminum alloys in secondary form.

[3]Reported figure.

[4]Not elsewhere specified.

[5]Output of limestone and serpentine for dimension stone is included with "Stone: Crushed and broken."

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TABLE 2
ITALY: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Alumina	Eurallumina S.p.A. (UC Rusal, 56.2%)	Plant at Portoscuso, Sardinia	1,000
Aluminum	Alcoa Italia S.p.A. (Alcoa Inc., 100%)	Smelters at Porto Vesme, Sardinia, and Fusina, near Venice	188
Asbestos	Amiantifera di Balangero S.p.A.	Mine at Balangero, near Turin	100
Barite	Bariosarda S.p.A. (Ente Mineraria Sarda)	Barega and Mont 'Ega Mines on Sardinia	100
Do.	Edem S.p.A. (Government)	Mines at Val di Castello, Lucca	20
Do.	Edemsarda S.p.A. (Soc. Imprese Industriali)	Mines at Su Benatzu, Sto. Stefano, and Peppixeddu, Sardina	20
Do.	Societá Mineraria Baritina S.p.A	Mines at Marigolek, Monte Elto, and Primaluna, near Milan	20
Bauxite	Sardabauxiti S.p.A. (Cogein S.p.A., 40%; Comtec S.p.A., 40%; Icofin Co., 20%)	Mine at Olmedo, Sardinia	350
Bentonite	Industria Chimica Carlo Laviosa S.p.A	Mines and plant on Sardinia and a plant near Pisa	250
Cement	52 companies, of which the largest are:		
Do.	Italcementi Fabbriche Riunite Cemento S.p.A.	18 plants, of which the largest are Calusco, Monselice, and Collefero	15,000
Do.	Buzzi Unicem Group	11 plants, of which Guidonia, Lugagnano, Morano, Piacenza, S'Arcangelo di Romagna, and Settimello are the largest	9,000
Do.	Cementerie del Tirreno S.p.A.	6 plants at Arquasta Scivia, Livorno, Maddaloni, Napoli, Spoleto, and Taranto	5,300
Copper:			
Refined	Simar S.p.A.	Refinery at Porto Marghera	60
Refined, secondary	KME Italy S.P.A.	Refinery at Fornaci di Barga	24
Do.	Sitindustrie S.p.A.	Refinery at Pieve Vergonte	22
Feldspar	At least 5 companies, of which the largest are:	Locations:	1,500
Do.	Maffei S.p.A.	Surface mines at Pinzolo and Campiglia	(200)
Do.	do.	Underground mine at Vipiteno	(300)
Do.	Miniera di Fragne S.p.A.	Surface mine at Alagna Valsesia	(60)
Do.	Sabbie Silicee Fossanova S.P.A.	Surface mine at Fossanova	(30)
Gold kilograms	Sargold Resources plc.	Furtei Mine near Cagliaria, Sardinia	1,400
Gypsum	Fassa S.r.l.	Plant at Moncalvo, Asti	90
Lead, metal	Glencore International AG	Refinery at San Gavino, Sardinia	100
Do.	do.	Kivcet smelter and Imperial smelter at Porto Vesme, Sardinia	80
Lignite	Ente Nazional per l'Energia Electrica	Surface mine at Santa Barbara (closed)	1,000
Lime	Unicale S.p.A.	Plants in Lombardy region	500
Magnesium, metal	Societa Italiana Magnesio S.p.A.	Plant at Bolzano	8
Marble	A number of companies, of which the largest include:	Locations:	2,000
Do.	Mineraria Marittima Srl	Quarries in the Carrara and Massa areas	(500)
Do.	Industria dei Marmi Vicentini S.p.A.	do.	(300)
Do.	Figaia S.p.A.	do.	(100)
Nitrogen, N content of ammonia	Hydro Agri S.p.A.	Plant at Ferrara	410
Petroleum:			
Crude	Eni SpA	Oilfields: offshore Sicily, in the Adriatic Sea, and onshore in Po River Valley	90
Refined thousand 42-gallon barrels per day	do.	5 refineries	2,000
Potash, ore	Industria Sali Otassici e Affini per Aziono S.p.A.	Underground mines at Corvillo, Pasquasia, Racalmuto, and San Cataldo, Sicily (closed)	1,300
Do.	Sta. Italiana Sali Alcalini S.p.A. (Italkali)	Underground mines at Casteltermini and Pasquasia, Sicily	700

See footnotes at end of table.

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TABLE 2—Continued
ITALY: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Pumice	Pumex S.p.A.	Quarries, Lipari Island, north of Sicily	600
Do.	Sta. Siciliana per l'Industria ed il Commercio della Pomice di Lipari S.p.A. (Italpomice S.p.A.)	do.	200
Pyrite	Nuova Solmine S.p.A.	Underground mines at Campiano and Niccioleta	900
Salt, rock	Sta Italiana Sali Alcalini S.p.A. (Italkahi)	Underground mines at Petralia, Racalmuto, and Realmonte, Sicily	4,000
Do.	Solvay S.p.A.	Underground mines at Buriano, Pontteginori, and Querceto, Tuscany	2,000
Steel	Ilva S.p.A. (Riva Group)	5 steel plants, the largest of which is Taranto (1,500)	4,000
Do.	Riva Acciaio S.p.A. (Riva Group)	7 steel plants	7,000
Do.	Acciaierie e Ferriere Vicentine Beltrame S.p.A. (AFV-Beltrame S.p.A.)	Steel plant at Vicenza	1,000
Talc	Luzenac Val Chisone S.p.A.	Mines at Pinerolo, near Turin, and at Orani, Sardinia	120
Do.	Talco Sardegna S.p.A.	Mine at Orani, Sardinia	20
Zinc, metal	Glencore International AG	Plant at Porto Vesme, Sardinia	120
Do.	Pertulosa Sud S.p.A.	Plant at Crotone, Calabria	100

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THE MINERAL INDUSTRY OF KAZAKHSTAN

By Richard M. Levine

Kazakhstan ranked second only to Russia among the countries in the region in its quantity of mineral production. It is endowed with large resources of a wide range of metallic ores, industrial minerals, and fuels, and its metallurgical sector is a major world and (or) regional producer of a large number of metals from domestic and imported raw materials. Its mining sector produced asbestos, bauxite, cesium, chromite, copper, germanium, gold, indium, iron, lead, manganese, rare-earth elements, scandium, and zinc in ores, and its metallurgical sector produced such metals as arsenic, beryllium, bismuth, cadmium, copper, ferroalloys, gallium, indium, lead, magnesium, molybdenum, niobium, rare-earth metals, rhenium, scandium, selenium, steel, tantalum, tellurium, titanium, and zinc. The country produced industrial minerals, such as asbestos, barite, and phosphate. Kazakhstan was also a large regional producer of such mineral fuels as coal, natural gas, and oil, and it was the world's leading uranium producer.

Minerals in the National Economy

In 2009, industrial production accounted for 53.6% of the gross domestic product (GDP) (Statistics Agency of the Republic of Kazakhstan, 2010, p. 11). The mineral extraction sector accounted for 60.3% of the value of industrial output; of that percentage, the extraction of crude oil accounted for 50.5% of the value of industrial output; nonferrous metal ores, 3.1%; iron ore; 1.5%; coal, 1.2%; natural gas, 0.4%; and other mineral extraction activities and services, the remainder. In the mineral processing sector, metallurgy accounted for about 11.8% of industrial output, of which production of nonferrous and precious metals composed about 6.5%, and ferrous metals, about 5.2%. The oil refining sector accounted for 2.3% of the value of industrial production (Statistics Agency of the Republic of Kazakhstan, 2010, p. 307, 308). In 2009, out of a total workforce of 7,903,400 people, the mining sector employed 197,900, or 2.5% of the total labor force (Statistics Agency of the Republic of Kazakhstan, 2010, p. 96). From 2003 through 2008, Kazakhstan attracted large net foreign direct investment inflows, which equaled 8% of the GDP; most of this investment was in the hydrocarbon sector (Rabobank Group, 2009).

Production

In 2009, production in Kazakhstan's mineral extraction sector remained relatively stable, showing moderate increases or decreases for most mineral commodities. Some mineral commodities, however, such as aluminum and uranium, showed percentage increases of more than 10% and others showed percentage decreases of more than 10%, including cadmium, coal, lead metal, lime, salt, and zinc metal. The largest change in production was the 65% increase in uranium output, which propelled Kazakhstan into becoming the world's leading uranium producer. Data on mineral production are in table 1.

Structure of the Mineral Industry

Eurasian Natural Resources Corporation PLC (ENRC) was a mining and metals group with more than 70,000 employees. The ENRC group controlled Aluminium of Kazakhstan (AoK), the Kazchrome chromite mining and ferroalloys production enterprise, Kazmarganets (which controlled the Zhayrem manganese mining and beneficiation complex), and the Sokolovsko-Sarbay Mining and Production Union (SSGPO), which was the main supplier of iron ore to Russia's Magnitogorsk Iron and Steel Works. The leading shareholder in ENRC was the copper company Kazakhmys PLC (Eurasian Natural Resources Corporation PLC, 2011e). ENRC also owned assets in mineral production enterprises in China (ferroalloys), Brazil (iron ore), the Democratic Republic of the Congo [Congo (Kinshasa)] (cobalt and copper), Mali (bauxite), Mozambique (coal), Russia (chrome ore and ferroalloys), South Africa (fluorspar and platinum), Zambia (cobalt and copper), and Zimbabwe (platinum) (Eurasian Natural Resources Corporation PLC, 2011c).

Kazakhmys, which was the country's leading copper producer, was a United Kingdom-registered copper mining company whose main assets were located in Kazakhstan. The company's headquarters was located in London and the headquarters of its main subsidiary, Kazakhmys Corp., was located in Zhezkazgan, Kazakhstan. In October 2005, the company was listed on the London Stock Exchange. Glencore International AG, which was headquartered in Switzerland, owned 50.7% of the shares of Kazzinc JSC, which was the country's leading integrated lead and zinc producer; Kazzinc also produced copper, gold, silver, and other byproduct metals (Kazzinc JSC, 2010a; Glencore International plc, 2011).

All the country's major oilfield and gasfield developments since achieving statehood in 1991 were by projects in which foreign companies and Kazakhstan state-owned firms had forms of joint ownership. The country's uranium industry was controlled by Kazatomprom National Atomic Co. Kazatomprom's stock was 100% held by the Government, and the company employed more than 25,000 people. Kazatomprom was also an importer, exporter, and transporter of uranium and other products used in the nuclear power industry (Interfax Russia & CIS Metals and Mining Weekly, 2007).

In January 2009, the Government of Kazakhstan established Tau-Ken Samruk to consolidate the Government's mining holdings under one entity. The new company was established for the purpose of improving efficiency in the approval process for mining projects and for increasing investment in the mining sector through raising awareness of investment opportunities. Tau-Ken Samruk reportedly could simplify matters for companies that worked with it in negotiating with the Government for new exploration projects. Tau-Ken Samruk also was established with the objective of working with international companies to develop technologies that were suited

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to developing Kazakhstan's mineral industry (Jones, Tarta, and Yukin, 2010, p. 81-82).

Mineral Trade

In 2009, the value of Kazakhstan's exports decreased by 39% compared with that of 2008, and the value of imports decreased by 25%. In 2009, fuels accounted for the majority of the value of exports, with exports of oil and gas condensate accounting for 61%; natural gas, 3.2%; petroleum refinery products, 2.8%; and coal, 1.2%. With respect to exports of metal, exports of refined copper in 2009 composed 3.3% of the value of total exports; rolled steel, 3.1%; ferroalloys, 2.7%; zinc metal, 0.9%; and lead metal, 0.3%. In 2009, the country's leading mineral commodity import was steel pipes, which accounted for 10.6% of the total value of exports, and the country also imported small amounts of coal, crude oil, natural gas, and petroleum refinery products (Statistics Agency of the Republic of Kazakhstan, 2010, p. 428-430).

Commodity Review

Metals

Aluminum.—AoK, which was a subsidiary of ENRC, was the second ranked alumina producer, by volume, in the region. AoK operated the Krasnooktyabrsk and the Torgay bauxite mining complexes and produced alumina at the Pavlodar aluminum plant. AoK also developed the Keregetas limestone mine. AoK employed about 12,000 people. The Kazakhstan aluminum smelter (KAS) in Pavlodar, which was the country's first aluminum smelter, was commissioned in December 2007 and reached its rated capacity of 125,000 metric tons per year (t/yr) in the second quarter of 2008. On May 1, 2010, KAS started up its second production line, which increased its total capacity to 250,000 t/yr (Eurasian Natural Resources Corporation PLC, 2011a).

In June 2009, ENRC announced that the London Metal Exchange (LME) had approved with immediate effect the listing of primary aluminum ingots produced at KAS. Registration of the ingots with the LME enabled the ingots to be sold into LME warehouses at LME list prices, which provided ENRC with more flexibility in its sales and marketing operations (Eurasian Natural Resources Corporation PLC, 2009).

Beryllium.—The Ulba Metallurgical Plant Joint Stock Company (UMP), which was part of Kazatomprom, was a world leader in beryllium production and was the world's leading supplier of primary series beryllium and its master alloys base. UMP intended to enhance its beryllium production process to obtain maximum competitive advantage with respect to production costs. Plans included improving existing technology for extracting beryllium from ores and concentrates to obtain cheaper beryllium hydroxide while maintaining quality on a par with existing hydroxide output; developing technologies and equipment for producing different products from beryllium bronze in accordance with domestic and world market requirements, including products for Kazakhstan's oil and gas industry; and improving equipment and technologies to upgrade existing capacities for producing beryllium metal and beryllium-bearing alloy. The new beryllium production and development strategy was focused on the output of competitive products with higher value added, based on state-of-the-art technologies (Kazatomprom National Atomic Co., 2011a).

In 2006, Kazatomprom concluded a joint-venture agreement with China for the production of beryllium copper flat-rolled products. Kazatomprom entered into the joint venture to take advantage of the prospect for sales in the Chinese market. UMP established a Kazakhstan-Chinese joint venture for the production of beryllium-bronze rolled metal in China with the Ningbo Xinye Electronic Copper Strip Co., which was part of the Shine Copper Industry Co., Ltd; each country had a 50% stake in the joint venture. Final registration in China of the Kazakhstan-Chinese joint venture as the Yingtan Ulba Shine Metal Materials Company Ltd. was completed in November 2007. The stated aim of the joint venture was the construction of a plant that would produce flat-rolled products from high-strength and highly conductive copper-beryllium alloy to meet the needs of Chinese consumers. Production was to include strips and other products from beryllium bronze, including sheets, rods, wire, and profiled rolled metal. Output was to be up to 2,000 t/yr of all types of products. Production volumes could be increased on the mutual agreement of the parties. The joint venture's products were to be sold in China and in overseas markets (Kazatomprom National Atomic Co., 2011b).

Chromium.—Kazakhstan has large resources of high-grade chromite ore with an average Cr_2O_3 content of 50.2%, which ranked Kazakhstan's resources among the highest grade chromite ore in the world. The country's chromite ore also has a low iron content and a low content of undesirable ore constituents, including phosphorus and sulfur. The country's reserves are concentrated in the northwestern part of the country in the Aktyubinsk region in the Kempirsay massif and distributed in more than 160 deposits, of which 20 were considered to be commercially significant. Kazakhstan reportedly had confirmed reserves calculated according to the reserve system that was used in the Soviet Union in categories A, B, and C1 of 316 million metric tons (Mt). The Soviet reserves classification does not tally reserves according to economic criteria used in market economy systems. The largest portion of these reported reserves (92%) were at depths that precluded their economic extraction (Kabaziyev and Outs, 2008).

In 2009, Kazakhstan was the world's third ranked chromite producer (Papp, 2011). Kazakhstan also produced chromium ferroalloys. Domestic demand for ferroalloys was low, and most of the country's ferroalloy production was exported to countries in Europe and Southeast Asia and to the United States. China was considered the most attractive prospective market for the county's ferroalloys (Kabaziyev and Outs, 2008).

In September 2008, the Russian steelmaker Mechel OAO commissioned its new Voskhod chrome ore mine in Aktyubinsk region. The Voskhod operation, which Meckel acquired in May 2008 from Oriel Resources Plc of the United Kingdom, was expected to become one of the world's leading suppliers of chrome concentrate once the mine's output reaches the facility's design capacity (Eurasian Development Bank, 2008; Mechel OAO, 2009).

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Kazchrome, which was a subsidiary of ENRC, was one of the world's leading ferrochrome producers. Its primary product was high-carbon ferrochrome, which had a chrome content of 68%. Kazchrome also produced ilmenite, rutile, and zircon concentrates and employed approximately 18,000 people. Kazchrome owned the Aksu and the Aktobe ferroalloy plants, the Donskoy chromite ore mining and processing complex, and the Kazmarganets manganese mining enterprise. ENRC also owned foreign chromite and ferrochrome producers, which included the Serov mining and metallurgical complex in the Sverdlovsk region in the Ural Mountains of Russia. ENRC had a 50% ownership stake in the Xinjiang Tuoli Taihang Ferro-Alloy Co. (Tuoli) in China, which was one of China's leading ferrochrome plants. The plant is located in Tuoli County, Xinjiang Province, about 300 kilometers (km) from the China-Kazakhstan border (Eurasian Natural Resources Corporation PLC, 2011b).

Copper.—Kazakhmys was the country's leading copper producer and ranked among the world's 10 leading copper producing companies. Its core business was the production and sale of copper, and the company's activities were fully integrated, from mining ore through metal production. The company also produced other metals as byproducts, including gold, silver, and zinc. Kazakhmys had operations across Kazakhstan, which included 17 open pit and underground mines, 10 concentrators, and 2 smelting and refining complexes; it also owned coal mines and powerplants, which supplied energy for the company's operations and also produced excess energy, which the company marketed commercially. Kazakhmys was developing the Atogay and the Bozshakol Mines, which were its two major projects to expand capacity; the mines were scheduled to be commissioned in 2015 and 2014, respectively (Kazakhmys PLC, 2011).

On December 30, 2009, Kazakhmys announced the allocation of a $2.7 billion unsecured loan from the China Development Bank Corp. and the Joint Stock Company Sovereign Wealth Fund Samruk-Kazyna (Samruk); $2.1 billion of the allocated funds was to be made available for the Bozshakol and the Bozymchak Mine development projects. The Bozshakol Mine was expected to produce about 100,000 t/yr of copper in concentrate when it reached full production capacity. The Bozymchak Mine is located in southwestern Kyrgyzstan; Kazakhmys acquired the deposit in 2008. An additional $200 million was to be assigned to the potential development of several existing mines. The remaining $400 million of the $2.7 billion allocation was to be available for assignment during the next 3 years and would be allocated to other growth projects (Silk Road Intelligencer, 2008; Gray, 2009; Kazakhmys PLC, 2010b).

In 2010, Kazakhmys agreed to engage in a joint venture with China's Jinchuan Group Ltd. whereby Kazakhmys would sell Jinchuan a 49% stake in its Aktogay project in eastern Kazakhstan. The two firms would share development costs, which were estimated to be between $1.5 billion and $2.0 billion. Aktogay was projected to produce 100,000 t/yr of copper in concentrate. The project involved development of a large open pit mine in the Ayoguz region of Kazakhstan. Aktogay reportedly was one of the leading undeveloped copper deposits in the world, with contained copper reserves that would support a mine life of 40 years. A feasibility study was expected to take about 1 year, and mine development was expected to take an additional 3 years (Mineprocessing, 2010).

In 2009, Kazakhmys produced 320,000 t of copper cathode from more than 32 Mt of ore with an average copper grade of 1.18% that yielded 359,000 t of copper in concentrate. In 2008, Kazakhmys produced 343,000 t of copper cathode. Kazakhmys was one of the leading employers in Kazakhstan, with 60,000 employees, and its revenues accounted for 2.5% of Kazakhstan's GDP (Kazakhmys PLC, 2010a, p. 18). Kazakhmys projected that output in 2010 through 2013 would remain at its 2009 level owing to declining ore grades at the older mines in the Zhezkazgan region and then would increase in 2014 with the commissioning of the Bozshakol Mine (Kazakhmys PLC, 2010a, p. 4, 5, 22, 23).

Kazakhmys sold its copper in Europe and to China, and these regions together accounted for between 80% and 90% of the company's sales, which were evenly divided between the two areas. China, however, was Kazakhmys' fastest growing market. Material exported to China was transported by rail, whereas material exported to Europe was sent by rail to the Black Sea for shipment (Kazakhmys PLC, 2010a, p. 9, 10).

At Kazzinc, which was the country's second ranked copper producer, blister copper production increased to 59,420 t in 2009 from 55,956 t in 2008. On December 21, 2010, Kazzinc produced its first batch of copper cathodes at its copper refinery in Oskamen, which was a new product for the company (Kazzinc JSC, 2010b).

Gallium.—Kazakhstan reportedly possesses about 6% of total gallium reserves in the region; total gallium reserves in the region reportedly exceed 10,000 t. Kazakhstan, along with Ukraine, was one of the major producers of metallic gallium in the region. Gallium production took place at ENRC's alumina refinery in Pavlodar (Infomine Research Group, 2007). ENRC reportedly produced 40% of the world's gallium output (Eurasian Natural Resources Corporation PLC., 2007).

Indium.—Kazakhstan possesses about 12% of the indium reserves in the region. Indium reserves in the region reportedly total more than 5,000 t. In Kazakhstan, indium was produced as a byproduct of lead and zinc production by Kazzinc, which had the capacity to produce metallic indium. Indium production in Kazakhstan was estimated to be less than 500 kilograms per year (kg/yr) (Infomine Research Group, 2007).

Iron Ore.—The Sokolovsko-Sarbay Mining Production Association (SSGPO) was ENRC's iron ore mining and beneficiation enterprise in Kazakhstan and the country's leading iron mining enterprise. It employed about 18,500 people. Its operations included the Kacharskiy, the Korzhinkolskiy, the Sarbayskiy, and the Sokolovskiy iron ore open pits; the Sokolovskiy underground mine; dolomite and limestone open pits; and crushing, concentrating and pelletizing facilities. Energy and heat were supplied by the Rudny heat and energy plant (Eurasian Natural Resources Corporation PLC, 2011d).

Lead and Zinc.—Kazzinc was Kazakhstan's leading producer of lead and zinc, and Kazzinc also produced copper and precious metals. The company's core operations were located mainly in the East Kazakhstan Region, and the

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company employed more than 22,000 people engaged in mining, beneficiation, metallurgy, power generation, and auxiliary operations. In 1997, the company was formed through the merger of East Kazakhstan's three leading lead and zinc producing companies—Leninogorsk Polymetallic Complex, Ust-Kamenogorsk Lead and Zinc Complex, and Zyryanovsk Lead Complex. The majority owner of the three companies was the Government of Kazakhstan. The company also included the Bukhtarma hydroelectric powerplant. The controlling block of shares in Kazzinc was sold by the Government to the private sector, and Glencore International became the company's main investor. Since its creation, Kazzinc had significantly increased its production capacity and output (Kazzinc JSC, 2010a).

In 2009, production of refined lead at Kazzinc decreased to 79,041 t from 90,240 t in 2008, but production of zinc metal increased to 301,104 t from 299,443 t in 2008 (Kazzinc JSC, 2010b, c). In 2009, Kazakhmys produced 149,000 t of zinc in concentrate, which was 9% more than in 2008. Kazakhmys' Akbastau Mine, which had a zinc ore grade of just 0.63%, was closed during 2009. Kazakhmys' zinc smelter's operations were suspended during 2009 as concentrate sales were commercially more attractive than metal sales. In 2010, the production of zinc concentrate at Kazakhmys was expected to decrease from the level achieved in 2009 as the contribution from stockpiled ore was to be reduced. There were no plans to restart the zinc smelter. In 2010, all zinc concentrate produced by Kazakhmys was to be sold to customers in Kazakhstan and exported to China (Kazakhmys PLC, 2010a, p. 23).

Manganese.—Kazakhstan reportedly has 429 Mt of manganese ore reserves, which reportedly ranks it third in the world in manganese reserves (Rakishev, 2008). This reserve figure was calculated according to the Soviet reserve classification system, which does not correspond to reserve systems based on market economy criteria. Manganese was mined at the Zhayrem manganese mining and beneficiation complex, which was a subsidiary of ENRC; it included the Ushkatyn-3 iron-manganese and barite-lead deposit, the Zhayrem barite-lead-zinc-silver deposit, and the Zhomart iron-manganese deposit. It supplied customers in Central Asia, China, Russia, and Ukraine (Eurasian Natural Resources Corporation PLC, 2011b).

Niobium and Tantalum.—Kazatomprom subsidiary UMP produced niobium products in the form of ingots, ligatures, powder, rolled products, and wire (Ul'binskiy metallurgicheskiy zavod, 2010). Kazatomprom also controlled the country's tantalum production, and its tantalum production complex was also located at UMP. This enterprise was one of the world's leading tantalum producers. It had a complete production cycle for reprocessing tantalum-niobium-bearing feedstock and producing finished products. Kazatomprom did not have its own tantalum resources and purchased tantalum concentrate. Kazatomprom had formed a strategic plan to develop its tantalum production sector, which included construction of a capacitor production plant and production of high-capacity tantalum capacitor powders. The major share of the world's tantalum is consumed in the production of such high-capacity tantalum powders, which are used mainly in the production of tantalum capacitors for the electronics industsry (Kazatomprom National Atomic Co., 2009a; 2011c).

Developing an appropriate technology for tantalum powder production in Kazakhstan was the impetus behind the Government's strategy of establishing a high-technology tantalum powder products sector. In December 2008, UMP opened a facility for the production of tantalum powder, and the facility's tantalum powders were tested and qualified by consumers from Russia. The powders were also being tested by companies in Israel and Japan, and consumers from Europe and the United States had signed contracts for additional testing of subcommercial lots of the high-capacity powders (Kazatomprom National Atomic Co., 2011c).

Rare Earths.—The Irtysh Rare Earths Company Ltd. (IRESCO) in East Kazakhstan processed rare-earth-metal chlorides from the Solikamsk magnesium plant in Russia and produced rare-earth compounds of cerium, europium, gadolinium, lanthanum, neodymium, praseodymium, and samarium, and polishing powders based on pure cerium oxide (Vereschagin and others, 2006; Irtysh Rare Earths Company Ltd., 2011).

In 2009, Kazatomprom and Sumitomo Corp. of Japan agreed to undertake recovery of rare-earth elements from uranium ore residues. By yearend 2009, a joint venture was to be formed to produce rare-earth concentrates from uranium tailings from open pit mines. Plans called for processing the concentrate at the Ulba metallurgical plant. The tailings were reportedly rich in such rare-earth elements as dysprosium and neodymium. The project was considered advantageous because of low development costs, a quick startup time, and less environmental impact from using tailings. Furthermore, Kazatomprom could supply significant infrastructure and engineering support. It was envisaged that the new rare-earth-metals production venture's entry into the dysprosium market would provide the world market with another source of this rare-earth element besides China. The joint venture would be the second between Kazatomprom and Sumitomo (the two companies had also formed a joint venture to produce uranium) (Lui, 2009).

Selenium and Tellurium.—Kazakhstan produced refined selenium and tellurium. Tellurium was produced at Kazzinc, and production was estimated to be between about 17 and 18 t/yr (Kul'chintskiy and Naumov, 2010). Available information on the production of selenium, which is generally produced from anode slimes generated in the electrolytic refining of copper, was not adequate to estimate selenium production.

Industrial Minerals

Phosphate Rock.—Kazakhstan reportedly is 1 of 10 countries that collectively possess 90% of the global phosphate rock resources. Kazakhstan produced phosphate rock in the Karatau phosphorite basin. The basin contains 45 deposits. The Karatau basin is located in the South Kazakhstan and the Zhambyl regions and extends for 25 km in width from northwest to southeast and is 120 km in length. The phosphate rock strata is near the surface, which makes it accessible for primarily open pit mining. More than 85% of the commercially developed phosphate rock deposits in the Karatau basin were surface mined and the remainder was mined by underground methods. The average content of P_2O_5 in phosphate rock from the Karatau basin was from between 21% and 27% and reached up to 30%

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at some deposits. The phosphate rock from the Karatau basin contains manganese oxide, which lessens the ore's quality (Ignatov & Company Group, 2010).

Kazphosphate LLC, which was established in 1999, was composed of the Karatau mining and processing complex (which contained the Chuluktau and the Zhanatas enterprises), the Novodzhambul phosphorus plant, a mineral fertilizers plant, a railway transportation complex, and a detergents plant. When Kazphosphate was established, its main task was to rehabilitate phosphate rock production, recover lost contacts in international markets, expand the geographical area of sales, and introduce new types of products. The Karatau mining and processing complex, which was created on the basis of the Karatau phosphorus basin, was the only supplier of phosphorous feedstock for the domestic phosphorus industry as well as for domestic and other Central Asian producers of mineral fertilizers. Kazphosphate mined six deposits by open pit and underground methods. The company had three main phosphate development objectives. These were (1) exploration for phosphate rock and the development of mining and processing of phosphate rock to produce phosphate fines and phosphate powder, (2) producing yellow phosphorus and its derivatives, and (3) producing phosphate fertilizers and feed phosphates (Galmor, 2002; Kazphosphate LLC, 2005).

Mineral Fuels and Related Materials

Coal.—At the end of 2009, according to the 2010 BP Statistical review of world energy, Kazakhstan's coal reserves totaled 31.3 billion metric tons (Gt), which equaled 3.78% of the world's total reserves. Kazakhstan reportedly had the largest recoverable coal reserves in Central Asia. About 70% of Kazakhstan's coal production was used for domestic power generation, as 80% of Kazakhstan's electric power requirements were coal based. Coal was also used in the iron and steel industries. The remainder of Kazakhstan's coal production was exported, mainly to Russia and Ukraine. According to the Kazakhstan Ministry of Energy and Natural Resources, the country was planning to produce between 100 and 105 million metric tons per year (Mt/yr) of coal by 2015 (BP p.l.c., 2010, p. 32; MBendi Information Services (Pty) Ltd., 2011).

Kazakhstan reportedly has more than 400 coal deposits. One-third of these deposits contains brown coal or lignite. Most of the country's coal production takes place in two basins—the Ekibastuz and the Karaganda In the Ekibastuz Basin, which was reportedly the third largest coal basin in the region, bituminous coal was mined to supply the electric power generation sector. In the Karaganda basin, coking coal was extracted from underground mines. Bogatyr Access Komir, LLP (BAK) was the leading surface mining company in Kazakhstan. BAK owned the Bogatyr Mine, which had a projected capacity of 50 Mt/yr. BAK was wholly owned by Access Industries of the United States. Kazakhstan's leading steel producer, Ispat-Karmet, which was a subsidiary ArcelorMittal of Luxembourg, operated several coal mines in the Karaganda region that produced more than 7 Mt/yr of coal that it used to supply its steel works (MBendi Information Services (Pty) Ltd., 2011).

Natural Gas.—According to the January 2010 Oil and Gas Journal, Kazakhstan's estimated proven natural gas reserves were reportedly 85 trillion cubic feet (about 2.4 trillion cubic meters). Almost all natural gas produced in Kazakhstan was associated gas. More than one-half of the country's gas reserves are in the Karachaganak oil and gas field, which reportedly has proven natural gas reserves of 48 trillion cubic feet (about 1.4 trillion cubic meters). In 2009, Kazakhstan switched from being a net natural gas importer to a net exporter of 134 billion cubic feet (about 3.8 billion cubic meters). In 2009, 69% of the gas produced was reinjected into the fields to enhance oil production. The two leading natural gas producing fields were also the two leading oil producing fields (U.S. Energy Information Administration, 2010b).

About one-half of Kazakhstan's total gross gas production was produced by the Karachaganak oil and gas field, which was projected by the consortium developing the field to reach 900 billion cubic feet (about 25.5 billion cubic meters) of gas by 2012. Gross gas production at the Tengiz oil and gas field reportedly could increase to 780 billion cubic feet (about 22 billion cubic meters) by 2015. The remainder of produced natural gas came from smaller fields. Kazakhstan reportedly planned to increase total gross gas production to 2.5 trillion cubic feet (70.8 billion cubic meters) by 2015. New pipeline infrastructure would allow the country to export its increased gas output (U.S. Energy Information Administration, 2010b).

Petroleum.—In 2009, Kazakhstan's oil production increased to about 76.4 Mt. Domestic oil consumption was less than 12 Mt. The eight leading producing fields were located onshore. The Tengizchevroil consortium, which was led by Chevron Corp. of the United States, was the country's leading oil producer followed by the national oil and gas company Kazmunaigaz (KMG). KMG also held a 20% interest in the Tegizchevroil consortium. Growth in oil production was dependent on increasing production at the three largest fields—Karachaganak, Kashagan, and Tengiz (U.S. Energy Information Administration, 2010c).

The Tengiz field, which is located onshore in northwestern Kazakhstan, was Kazakhstan's leading oil producing field, with recoverable crude oil reserves estimated by consortium leader Chevron to be between about 800 Mt and 1.2 Gt [6 billion barrels (Gbbl) and 9 Gbbl]. Tengiz had been under development since 1993. Output from Tengiz was exported through the Caspian Pipeline Consortium (CPC) oil pipeline, which runs from Tengiz to Novorossiysk, Russia, on the Black Sea (U.S. Energy Information Administration, 2010c).

The Karachaganak field, which is also located onshore in northwestern Kazakhstan, has reserves of about 1.1 to 1.2 Gt (8 Gbbl to 9 Gbbl) of oil and gas, according to the operating consortium Karachaganak Petroleum Operating (KPO). The KPO consortium was working under a production-sharing agreement (PSA) signed in 1997 to develop the field for 40 years. KPO was able to export is condensate through Russia using the Tengiz-Novorossisk pipeline. Karachaganak's Phase 3 development program, which was aimed at increasing condensate output, was reportedly suspended owing to delays in upgrading and expanding the Orenburg processing plant in Russia (U.S. Energy Information Administration, 2010c).

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The Kashagan field, which is located off the northern shore of the Caspian Sea near the city of Atyrau, was believed to be the largest known oilfield in terms of reserves outside of the Middle East and the fifth largest in the world. The consortium that had been developing the field was the Agip Kazakhstan North Caspian Operating Co. (Agip KCO). In January 2009, Agip KCO was replaced by the North Caspian Operating Co. (NCOC) PSA, which also operated other fields in the area, such as the Aktote, the Kairan, and the Kalamkas fields. Members of the NCOC venture included Eni S.p.A. of Italy, Exxon Mobil Corp. of the United States, JSC KazMunaiGas (KMG), Royal Dutch Shell plc of the Netherlands, and Total S.A. of France, each with a 16.8% share; ConocoPhillips Co. of the United States, which held an 8.4% share; and Inpex Corp. of Japan, which held a 7.6% share. In July 2010, KMG and Shell signed an agreement that they would jointly manage production when the field came online. Kashagan's recoverable reserves were estimated to be 11 Gbbl (about 1.5 Gt) of oil. The timetable for production startup had been been delayed to October 2013, which was 8 years later than the original scheduled startup date of 2005. Initial production from phase 1 was projected to be 370,000 to 450,000 barrels per day (bbl/d) (about 18.4 to 22.3 Mt/yr), and production was projected to peak at 1.5 million barrels per day (Mbbl/d) (about 75 Mt/yr) when phase 2 was projected to come online in 2019. Cost overruns associated with the field's adverse operating environment were considered responsible for much of the delay. Development of Kashagan presented particular challenges, as the field contains a high proportion of natural gas under very high pressure, the oil in the field contains large quantities of sulfur, and the offshore platforms needed to develop the field would need to be constructed to withstand the extreme weather fluctuations in the northern Caspian Sea. The Kashagan field lies in only 3 to 5 meters of water, and drilling and extraction operations were to proceed from artificial islands. Existing pipelines to China and Russia would be able to handle only phase 1 output from Kashagan. The timing of the development of phase 2 of the Kashagan field would also determine the timing of construction of new refining and export capability at Kuryk (U.S. Energy Information Administration, 2010c).

Kazakhstan ranked as an important exporter of light, sweet crude oil. In 2009, Kazakhstan had net oil exports of about 1.3 Mbbl/d (about 65 Mt/yr), which was delivered to world markets by pipeline to the Black Sea by way of Russia; by barge and pipeline to the Mediterranean Sea by way of Azerbaijan and Turkey; by barge and rail to Batumi, Georgia, on the Black Sea; and by pipeline to China. Kazakhstan's Prime Minister in an interview in October 2009 projected that Kazakhstan would increase its oil exports to 3 Mbbl/d (about 149 Mt/yr) by 2020, but achieving such rapid growth of oil production would necessitate increasing export capacity (U.S. Energy Information Administration, 2010c).

Uranium.—According to Kazatomprom, Kazakhstan reportedly hosts about 19% of the world's explored uranium reserves, or about 1.6 Mt of uranium. The uranium deposits are grouped into the following six uranium provinces: the Chu-Sarysu uranium ore province with the Kanzhugan, the Moinkum, and the Uvanas Mines in operation; the Syrdarya uranium ore province, with the Northern Karamurun and the Southern Karamurun Mines in operation; the Northern Kazakhstan uranium ore province, with the Vostok Mine and the Stepnogorsk mill in operation; the Caspian uranium ore province with uranium production mothballed in this province since the collapse of the Soviet Union; the Balkhash uranium ore province, with uranium mining discontinued after the major deposits were depleted during the Soviet era; and in the Ili uranium ore province, where uranium occurs mainly in uranium-coal deposits, but where no uranium was being produced (Kazatomprom National Atomic Co., 2009b). Kazakhstan had established joint ventures with a number of companies from different countries to mine its uranium reserves (Interfax Russia & CIS Metals and Mining Weekly, 2009).

In 2009, Kazakhstan produced 14,020 t of uranium (U content), which was about 65% greater than in 2008 and made Kazkahstan the world's leading uranium producer. Kazatomprom's uranium development program called for uranium production to increase to 15,000 t in 2010. Two new uranium mines were expected to be commissioned in 2010 (Kazatomprom National Atomic Co., 2011d).

Outlook

Kazakhstan's long-term mineral development prospects remain promising, and in 2009, Kazakhstan had become the world's leading uranium producer. With the completion of development of its major oilfields, Kazakhstan could become one of the world's five leading oil producers within the next decade. In 2009, Kazakhstan produced about 76.4 Mt of oil, which already had made it a major oil producer. With continued development of its giant Karachaganak, Kashagan, and Tengiz fields, current production was expected at least to double by 2019. Kazakhstan's sector of the Caspian Sea was believed to contain a number of other major oil and natural gas deposits that had not yet been developed (U.S. Energy Information Administration, 2010a).

Production growth had been taking place in practically all sectors of the mineral industry and was expected to continue in the next decade. Kazakhstan was adding capacity to increase copper production, which would result in an increase not only in the output of copper, but also in that of byproduct metals. China was playing an active role in the development of Kazkakhstan's metal resources and was considered to be the most prospective market for Kazkahstan's mineral exports.

References Cited

BP p.l.c., 2010, Statistical review of world energy: London, United Kingdom, BP p.l.c., June, 45 p.

Eurasian Development Bank, 2008, Commercial chromite project launched: Eurasian Development Bank, September 22. (Accessed March 6, 2011, at http://www.eabr.org/eng/media/press/index.wbp?article-id=A1C31E7A-453C-4803-B51C-5027E5CFFA66&page=10.)

Eurasian Natural Resources Corporation PLC, 2007, ENRC's social projects are recognized as being the best in Kazakhstan: Eurasian Natural Resources Corporation PLC, October 19. (Accessed February 5, 2010, at http://www.enrc.com/files/19Oct2007.)

Eurasian Natural Resources Corporation PLC, 2009, LME approves listing of ENRC aluminium: Eurasian Natural Resources Corporation PLC, June 12. (Accessed February 27, 2011, at http://www.enrc.com/Documents/PressReleases/12-06-09_LME_approves_Listing_of_ENRC_Aluminium.pdf.)

Digitized by Google

Eurasian Natural Resources Corporation PLC, 2011a, Alumina & alumina: Eurasian Natural Resources Corporation PLC. (Accessed February 25, 2011, at http://www.enrc.com/en-GB/Our-Divisions/Aluminia-Aluminium/.)
Eurasian Natural Resources Corporation PLC, 2011b, Ferroalloys: Eurasian Natural Resources Corporation PLC. (Accessed February 27, 2011, at http://www.enrc.com/en-GB/Our-Divisions/Ferroalloys/.)
Eurasian Natural Resources Corporation PLC, 2011c, Global operations: Eurasian Natural Resources Corporation PLC. (Accessed October 26, 2011, at http://www.enrc.com/en-GB/GlobalOperation.)
Eurasian Natural Resources Corporation PLC, 2011d, Iron ore: Eurasian Natural Resources Corporation PLC. (Accessed February 25, 2011, at http://www.enrc.com/en-GB/Our-Divisions/Iron-Ore/.)
Eurasian Natural Resources Corporation PLC, 2011e, Key financial information: Eurasian Natural Resources Corporation PLC. (Accessed October 26, 2011, at http://www.enrc.com/en-GB/Investors/Key-Financial-Information/.)
Galmor, Nahum, 2002, Kazphosphate—Reviving a giant of the Kazakhstani economics: Kazakhstan International Business Magazine, no. 4. (Accessed March 8, 2011, at http://www.investkz.com/en/journals/33/233.html.)
Glencore International plc, 2011, Kazzinc: Glencore International plc. (Accessed October 27, 2011, at http://www.glencore.com/kazzinc.php.)
Gray, Alistair, 2009, Kazakhmys gets funding from China: Financial Times [London, United Kingdom], December 30. (Accessed February 25, 2011, at http://www.ft.com/cms/s/0/c229a91e-f576-11de-90ab-00144feab49a.html#axzz1F0XgAW2D/)
Ignatov & Company Group, 2010, Phosphorus for Eurasia—Phosphate rock in Kazakhstan: Emerging Market Venue, September 14. (Accessed March 8, 2011, at http://blog.ignatov.biz/2010/09/14/kazaakhstan_phosphorite/.)
Infomine Research Group, 2007, Materials for electronics in CIS—Gallium and indium: Global Information, Inc. market research report. (Accessed January 8, 2010, at http://www.the-infoshop.com/report/info42697-gallium.html.)
Interfax Russia & CIS Metals and Mining Weekly, 2007, Uranium industry in Kazakhstan (part II): Interfax Russia & CIS Metals and Mining Weekly, issue 3, January 1-18, p. 13.
Interfax Russia & CIS Metals and Mining Weekly, 2009, Kazakhstan aiming to be world's leading uranium producer in 2009: Interfax Russia & CIS Metals and Mining Weekly, issue 4, January 30-February 5, p. 25.
Irtysh Rare Earths Company Ltd., 2011, Information: Irtysh Rare Earths Company Ltd. (Accessed March 7, 2011, at http://www.iresco.kz/information.html.)
Jones, Alasdair, Tarta, Ramona, and Yukin, Eugene, 2010, Kazakhstan Mining: Engineering and Mining Journal, December, v. 211, no. 10, p. 56-94.
Kabaziyev, B.M., and Outs, R., 2008, Stoitiel'stvo gorno-obogotitel'nogo kombinata na mestorozhdenii khromovikh rud Voskhoda [Construction of a mining-beneficiation complex based on chromite ores of the Voskhod deposit]: Gornyy Zhurnal [Mining Journal], no. 2, p. 58-60.
Kazakhmys PLC, 2010a, Annual report and accounts 2009: Kazakhmys PLC, 168 p. (Accessed February 24, 2011, at http://www.kazakhmysara2009.blacksunplc.com/pdf/full_report.pdf.)
Kazakhmys PLC, 2010b, Kazakhmys PLC announces signing of a further facility agreement under $2.7 billion financing package: Kazakhmys PLC, January 13. (Accessed February 24, 2011, at http://www.kazakhmys.com/uploads/kazplcannouncessigningofafrtherfacilityagreement130110.pdf.)
Kazakhmys PLC, 2011, Group overview: Kazakhmys PLC. (Accessed February 24, 2011, at http://www.kazakhmys.com/group-overview.aspx.)
Kazatomprom National Atomic Co., 2009a, Kazatomprom today: Kazatomprom National Atomic Co., May 9. (Accessed May 8, 2009, at http://www.kazatomprom.kz/en/pages/Kazatomprom_today.)
Kazatomprom National Atomic Co., 2009b, Uranium deposits: Kazatomprom National Atomic Co., May 9. (Accessed May 8, 2009, at http://www.kazatomprom.kz/en/pages/uranium_deposits.)
Kazatomprom National Atomic Co., 2011a, Beryllium production development: Kazatomprom National Atomic Co., March 6. (Accessed March 6, 2011, at http://www.kazatomprom.kz/en/pages/Beryllium_production_development.)
Kazatomprom National Atomic Co., 2011b, CuBe flat rolled products: Kazatomprom National Atomic Co., March 3. (Accessed March 6, 2011, at http://www.kazatomprom.kz/en/pages/CuBe_flat-rolled_products.)
Kazatomprom National Atomic Co., 2011c, High capacity tantalum powders: Kazatomprom National Atomic Co., March 3. (Accessed March 6, 2011, at http://www.kazatomprom.kz/en/pages/High_Capacity_Tantalum_Powders.)
Kazatomprom National Atomic Co., 2011d, Uranium mining: Kazatomprom National Atomic Co., March 6. (Accessed March 6, 2011, at http://www.kazatomprom.kz/ru/pages/dobycha_urana.)
Kazphosphate LLC, 2005, Activities: Kazphosphate LLC. (Accessed October 30, 2011, at http://www.kazphophate.kz/eng/activities/.)
Kazzinc JSC, 2010a, About company: Kazzinc JSC. (Accessed November 9, 2011, at http://www.kazzinc.com/index_next.php?id=1&lang=1.)
Kazzinc JSC, 2010b, Kazzinc produces its first copper cathode: Kazzinc JSC, December 22. (Accessed February 25, 2011, at http://www.kazzinc.com/index_next.php?id=7&lang=1&action=show_news&id_news=91.)
Kazzinc JSC, 2010c, Production: Kazzinc JSC. (Accessed October 26, 2011, at http://www.kazzinc.com/index_next.php?id=21&lang=1.)
Kul'chintskiy, N.A., and Naumov, A.V., 2010, Redkiye metally I poluprovodnikovye materialy [Rare metals and semiconductor materials]: Tsvetnaya Metallurgiya [Nonferrous Metallurgy], no. 2, p. 31-44.
Lui, Chris, 2009, Sumitomo Corp in rare-earth recovery project in Kazakhstan: JCN Network, August 31. (Accessed February 3, 2010, at http://www.japancorp.net/Article.asp?Art_ID=21914.)
MBendi Information Services (Pty) Ltd., 2011, Coal mining in Kazakhstan—Overview: MBendi Information Services (Pty) Ltd. (Accessed March 9, 2011, at http://mincom.mbendi.com/indy/ming/coal/as/kz/p0005.htm.)
Mechel OAO, 2009, About us: Mechel OAO. (Accessed March 6, 2011, at http://www.mechel.com/about/common_data/index.wbp.)
Mineprocessing, 2010, Kazakhmys signs JV with Jinchuan to develop Aktogay copper project: Mineprocessing, April 26. (Accessed February 25, 2011, at http://www.mineprocessing.com/News/detail-3181.html.)
Papp, J.F., 2011, Chromium: U.S. Geological Survey Mineral Commodity Summaries 2011, p. 42-43.
Rabobank Group, 2009, Country report—Kazakhstan: Rabobank Group, May, 8 p. (Accessed February 5, 2010, at http://overons.rabobank.com/content/images/Kazakhstan 9_tcm64-85834.pdf.)
Rakishev, B.R., 2008, Mineral'nay produktsiya Kazakhstana na mirovom rynke [The mineral production of Kazakhstan on the world market]: Gornyy Zhurnal [Mining Journal], no. 3, p. 5-8.
Silk Road Intelligencer, 2008, Kazakhmys plans to start gold production at Bozymchak in Kyrgyzstan in 2009: Silk Road Intelligencer, July 15. (Accessed February 25, 2011, at http://silkroadintelligencer.com/2008/07/15/kazakhmys-plans-to-start-gold-production-at-bozymchak-in-kyrgyzstan-in-2009/.)
Statistics Agency of the Republic of Kazakhstan, 2010, Statisticheskiy Yezhegodnik 2009 [Statistical yearbook 2009]: Statistics Agency of the Republic of Kazakhstan, 503 p. (Accessed October 10, 2011, at http://old.uib.kz/files/Staz_.)
Ul'binskiy metallurgicheskiy zavod, 2010, Proizvodstvo tantala I niobii [Manufacture of tantalum and niobium]: Ul'binskiy metallurgicheskiy zavod: Kazatomprom National Atomic Co. (Accessed January 30, 2010, at http://www.ulba.kz/ru/industry3.htm.)
U.S. Energy Information Administration, 2010a, Kazakhstan—Background: U.S. Energy Information Administration, November. (Accessed March 13, 2011, at http://www.eia.doe.gov/cabs/Kazakhstan/Background.html.)
U.S. Energy Information Administration, 2010b, Kazakhstan—Natural gas: U.S. Energy Information Administration, November. (Accessed March 13, 2011, at http://www.eia.doe.gov/cabs/kazakhstan/NaturalGas.html.)
U.S. Energy Information Administration, 2010c, Kazakhstan—Oil: U.S. Energy Information Administration, November. (Accessed March 13, 2011, at http://www.eia.doe.gov/cabs/Kazakhstan/Oil.html.)
Vereschagin, Yu.A., Kudrevaykh, N.V., Malygin, M.A., and Emelina, T.N., 2006, Rare-earth magnets in Russia—Raw materials, processing, properties control and output Issues: Journal of Iron and Steel Research—International, v. 13, supplement 1, p. 23-32.

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TABLE I

KAZAKHSTAN: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007	2008	2009
METALS						
Aluminum:						
Alumina		1,505,415	1,514,749	1,555,859	1,713,818 r	1,608,000
Bauxite		4,815,400	4,883,800	4,942,600	5,160,100	5,130,000
Metal, primary		--	--	-- r	106,000 r	126,910
Arsenic trioxide e		1,500	1,500	1,500	1,500	1,500
Beryllium		NA	NA	NA	NA	NA
Bismuth: e						
Mine output, Bi content		150	160	145	150	150
Metal, refined		120	115	120	125	125
Cadmium, metal		2,000 r	2,000	2,100	2,100 e	1,800 e
Chromite		3,581,242	3,366,078	3,687,200	3,629,000	3,333,197
Copper:						
Mine output, Cu content		401,700	434,100	406,500	421,700	390,000 e
Metal:						
Smelter, undifferentiated		404,817	426,000 e	392,834	392,575	365,000 e
Refined, primary		418,356	427,723	406,091	398,411 r	368,133
Gallium	kilograms	16,000 r, e	17,000 r, e	18,666 r	18,666 r	18,702
Gold:						
Mine output, Au content	do.	17,875 r	21,824 r	22,564 r	20,825 r	22,525
Metal, refined	do.	9,774	9,011	8,157	8,205	8,734
Iron and steel:						
Iron ore, marketable:						
Gross weight		19,471,100	22,262,600	23,834,100	21,486,300	22,289,600
Fe content e		11,100,000	12,700,000	13,600,000	12,300,000 r	12,800,000
Metal:						
Pig iron		3,581,090	3,400,000	3,240,000	2,761,000	2,700,000 e
Ferroalloys:						
Ferrochromium		1,156,168	1,200,000 e	1,307,536	1,220,315	1,100,000 e
Ferrochromiumsilicon		97,870	100,000 e	145,695	133,828	125,000 e
Ferromanganese e		2,100	2,100	2,100	2,100	1,900
Ferrosilicon		104,185	105,000 e	59,886	54,964	55,400 e
Silicomanganese		170,214	220,000 e	188,445	179,939	180,000 e
Other e		9,000	9,000	9,000	9,000	8,500
Total		1,539,537	1,640,000 e	1,712,662	1,600,146	1,470,000 e
Steel:						
Crude		4,476,642	4,244,521	4,784,105	4,243,582	4,146,810
Finished, rolled		3,104,724 r	2,996,610 r	3,440,708 r	2,826,202 r	2,980,293
Lead:						
Concentrate, Pb content		31,000	48,100	40,200	38,800	39,400
Refined, primary and secondary		135,446	115,974	117,641	105,766	87,829
Magnesium, metal, primary e		20,000	21,000	21,000	21,000	21,000
Manganese ore, crude ore:						
Gross weight		2,233,200 r	2,531,100	2,482,000	2,485,000	2,467,700
Mn content e		540,000	550,000	600,000	600,000	595,000
Molybdenum, concentrate, Mo content		230	250	400	400	380
Nickel, Ni content of laterite ore e		193 [3]	200	200	500	500
Niobium, metal	kilograms	NA r	NA r	NA r	NA r	NA
Rhenium e	do.	8,000	8,000	5,500 r	5,500 r	3,000
Silicon		95,000	95,000	95,000	95,000	95,000
Silver:						
Mine output, Ag content	kilograms	832,103 r	806,083 r	722,927 r	645,627 r	678,226
Refined	do.	812,095	796,234	707,954	628,763	673,598
Tantalum, metal		NA	NA	NA	NA	NA
Tin, mine output, Sn content		-- r	-- r	-- r	-- r	--

See footnotes at end of table.

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TABLE 1—Continued

KAZAKHSTAN: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007	2008	2009
METALS—Continued						
Titanium:						
Ilmenite and leucoxene		10,000	25,000	25,000	25,000	25,000
Sponge		19,000	23,000	25,400	26,000	16,800
Vanadium, ores, concentrates, slag, Va content[e]		1,000	1,000	1,000	1,000	1,000
Zinc:						
Concentrate, Zn content		364,300	404,600	386,000	387,400	418,600
Smelter, primary and secondary		364,821	364,821	358,226	365,561 r	328,834
INDUSTRIAL MINERALS						
Asbestos, all grades		305,500	314,700	292,600	230,100	230,000
Barite, marketable		251,000	251,000	280,300	492,200	490,000 e
Boron[e]	thousand metric tons	30	30	30	30	30
Cement		4,181,200 r	4,880,200	5,698,600	5,837,300 r	5,998,200
Fluorspar[e]		4,750 [3]	30,000	64,000 [3]	66,300	67,000
Gypsum		820,000	820,000	653,608	696,909	700,000 e
Lime		993,544	988,094	1,023,178	905,917	803,580
Phophate rock:						
Gross weight		800,000 r	845,000 r	720,000 r	1,226,000 r	1,230,000 e
P_2O_5 content[e]		175,000 r	195,000 r	165,000 r	280,000 r	280,000
Salt and sodium chloride		178,167	416,680	227,643	504,100 r	213,320
Sulfur, byproduct:[e]						
Metallurgy		325,000 r	300,000 r	300,000	300,000	300,000
Natural gas and petroleum		1,700,000 r	1,700,000 r	1,660,700 [3]	1,732,600 [3]	1,700,000
Total		2,030,000 r	2,000,000 r	1,960,000	2,030,000	2,000,000
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Bituminous	thousand metric tons	82,788	91,547	94,014	106,296	90,888
Lignite	do.	3,798	4,773	4,370	4,777 r	4,882
Total	do.	86,586	96,320	98,384	111,073 r	95,770
Coke		2,491,900	2,627,500	2,925,000	2,687,700	2,716,800
Natural gas	thousand cubic meters	14,494,000	14,440,000	16,677,200	18,708,200	18,132,400
Petroleum:						
Crude oil and gas condensate:						
In gravimetric units		61,486,000	65,003,100	67,125,300	70,671,000	76,383,500
In volumetric units[e]	42-gallon barrels	451,000,000	478,000,000	493,000,000	520,000,000	565,000,000
Refinery products		11,170,000	11,664,000	12,000,000 e	11,790,500	11,590,800
Uranium:						
U content		4,357	5,279	6,633 r	8,513 r	14,020
U_3O_8 content		5,138	6,226	7,822 r	10,039 r	16,534

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. do. Ditto. NA Not available. -- Zero.

[1]Table includes data available through January 31, 2011.

[2]In addition to the commodities listed, Kazakhstan also produced a number of other mineral products, which included cesium, germanium, indium, rare-earth elements, scandium, selenium, and tellurium, but information is inadequate to estimate production.

[3]Reported figure.

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TABLE 2

KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity[e]
Alumina	Pavlodar aluminum plant [Eurasian Natural Resources Corporation PLC (ENRC)]	Pavlodar	1,800,000
Aluminum, primary	Kazakhstan aluminum smelter [Eurasian Natural Resources Corporation PLC (ENRC)]	do.	250,000
Arsenic trioxide	Chimkent polymetallic enterprise and other nonferrous metallurgical enterprises	Shymkent	3,500
Asbestos	Facilities:	Locations:	1,000,000
	Dzhetygara complex	Qostanay	
	Chilisay complex	Aqtobe phosphorite basin	
Barite	Facilities:	Locations:	300,000
	Karagaylinskiy and Zhayrem mining and beneficiation complexes	Karagayly, Zhayrem deposit	
	Tujuk Mine	Almaty	
	Achisay polymetallic complex	Kentau region	
Bauxite	Torgay and Krasnooktyabrsk bauxite mining complexes [Eurasian Natural Resources Corp. PLC (ENRC)]	Central Kazakhstan	5,500,000
Beryllium, metal	Ulba Metallurgical Plant JSC (UMP)	Oskemen	NA
Bismuth, metal	Facilities:	Locations:	2,200
	Ust-Kamenogorsk lead-zinc metallurgical plant (Kazzinc JSC)	Oskemen	
	Ridder lead smelter (Kazzinc JSC)	Ridder	
Do.	Chimkent refinery	Shymkent	20
Cadmium	do.	do.	NA
Do.	Ridder mining-beneficiation complex (Kazzinc JSC)	East Kazakhstan	2,200
Chromite, mine output, Cr_2O_3 content (50%)	Donskoy GOK mining-beneficiation complex [Kazchrome, a subsidiary of Eurasian Natural Resources Corporation PLC (ENRC)]	Khromtau, Kimpirsay region	5,000,000
Coal	Bogartyr coalfield	Northern Kazakhstan	NA
Do.	Ekibastuz Basin	Central and north-central parts of the country	95,000,000
Do.	Karaganda Basin	do.	50,000,000
Do.	Maykuben Basin	do.	10,000,000
Do.	Severny coalfield	Northern Kazakhstan	NA
Do.	Shubarkul Basin	Central and north-central parts of the country	6,500,000
Do.	Torgay Basin	do.	1,000,000
Copper:	Kazakhmys PLC mines:		
Mining, recoverable, Cu content	Balkhash complex:		
	Kounrad Mine	South-central Kazakhstan	11,800
Do.	Sayak Mine	do.	23,500
Do.	Shatyrkul Mine	do.	12,700
Do.	East region:		
	Artemyevskoe Mine	East Kazakhstan	7,820
Do.	Belousovskoe Mine	do.	2,700
Do.	Irtyshskoe Mine	do.	5,750
Do.	Nikolaevskoe Mine	do.	25,700
Do.	Orlovskoe Mine	do.	86,200
Do.	Yubileyno-Snegirikhinskoe Mine	do.	14,200
Do.	Karaganda region:		
	Abyz Mine	North-central Kazakhstan	5,710
Do.	Nurkazgan Mine	do.	1,190

See footnotes at end of table.

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TABLE 2—Continued
KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity[e]
Copper—Continued:			
Mining, recoverable, Cu content—Continued	Kazakhmys PLC mines—Continued:		
	Zhezkazgan complex:		
	Annensky Mine	North-central Kazakhstan	6,630
Do.	East Mine	do.	65,800
Do.	North Mine	do.	32,500
Do.	South Mine	do.	71,600
Do.	Stepnoye Mine	do.	31,700
Do.	West Mine	do.	23,300
Do.	Kazzinc JSC (Glencore International AG, 99%):		
	Ridder:		
	Ridder-Sokolny Mine	East Kazakhstan	NA
Do.	Shubinsky Mine	do.	2,750
Do.	Tishinsky Mine	do.	15,000
Do.	Zyrianovsk: Maleevsky Mine	do.	62,100
Processing, recoverable, Cu content	Kazakhmys PLC mines or plants:		
	Balkhash complex: Balkhash concentrator	South-central Kazakhstan	39,500
Do.	East region:		
	Belousovskoe Mine	East Kazakhstan	2,100
Do.	Irtyshskoe Mine	do.	3,890
Do.	Nikolaevskoe Mine	do.	21,200
Do.	Orlovskoe Mine	do.	77,800
Do.	Karaganda region: Abyz Mine	North-central Kazakhstan	4,000
Do.	Zhezkazgan complex:		
	Stepnoye Mine	do.	58,200
Do.	Zhezkazgan concentrator:		
	Number 1	do.	88,800
Do.	Number 2	do.	111,000
Do.	Kazzinc JSC:		
	Ridder: Ridder concentrator	East Kazakhstan	NA
Do.	Zyrianovsk: Zyrianovsk concentrator	do.	1,200
Metal	Kazakhmys PLC mines or plants:		
	Balkhash complex:		
	Balkhash smelter	South-central Kazakhstan	250,000
Do.	Balkhash refinery	do.	250,000
Do.	Zhezkazgan complex:		
	Zhezkazgan smelter	North-central Kazakhstan	215,000
Do.	Zhezkazgan refinery	do.	250,000
Do.	Kazzinc JSC: Ust-Kamenogorsk: Lead smelter	Oskemen	80,000
Do.	Kazzinc JSC: Copper refinery	do.	NA
Ferroalloys:			
Ferrochrome:			
High-carbon 60%	Aqtobe (Aktyubinsk) plant [Kazchrome, a subsidiary of Eurasian Natural Resources Corporation PLC (ENRC)]	Aqtobe	200,000
Medium-carbon 60%	do.	do.	200,000
Do.	Aksu plant [Kazchrome, a subsidiary of Eurasian Natural Resources Corporation PLC (ENRC)]	Aksu	200,000
Ferrosilicon	do.	do.	700,000
Ferrosilicochrome	do.	do.	700,000
Ferrochrome, high-carbon	do.	do.	500,000
Silicomanganese	do.	do.	90,000
Gallium	Pavlodar aluminum plant [Eurasian Natural Resources Corporation PLC (ENRC)]	Pavlodar	NA
Gold	Byproduct of polymetallic ores and native gold mining	NA	30

See footnotes at end of table.

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TABLE 2—Continued

KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity[e]
Indium	Kazzinc JSC	East Kazakhstan	NA
Iron and steel:			
Pig iron	Ispat-Karmet Steelworks (ArcelorMittal)	Karaganda	5,000,000
Steel, crude	do.	do.	6,300,000
Iron ore, marketable	Lisakovskiy and Sokolovsko-Sarbay Mining and Production Union (SSGPO)	Qostanay	25,000,000
Lead:			
Mining, recoverable Pb content of ore	Kazzinc JSC:		
	Ridder:		
	Shubinsky Mine	East Kazkahstan	461
Do.	Tishinsky Mine	do.	15,000
Do.	Zyrianovsk:		
	Grekhovsky Mine	NA	240,000
Do.	Maleevsky Mine	NA	35,100
Mining, gross weight Pb-Zn ore	ShalkiyaZinc N.V.	Kyzylorda Region	3,000,000
Processing, recoverable Pb content of ore	Kazzinc JSC: Ridder concentrator	East Kazakhstan	NA
Do.	ShalkiyaZinc N.V. processing plant	Kentau	NA
Metal	Chimkent smelter	Shymkent	60,000
Do.	Kazzinc JSC: Ust-Kamenogorsk lead smelter	Oskemen	168,000
Magnesium, metal	Ust-Kamenogorsk titanium-magnesium plant	do.	23,000
Manganese, crude ore	Facilities:	Locations:	2,550,000 [2]
	Atasurda	Atasu, Qaraghandy Region	
	Kazakmarganets [Kazchrome, a subsidiary of Eurasian Natural Resources Corporation PLC (ENRC)]	Tur and East Kamys Mines, Qarahandy region	
	Sary-Arkapolimetal	Zhayrang, Qaraghandy region	
	Zhezdy processing plant [Kazchrome, a subsidiary of Eurasian Natural Resources Corporation PLC (ENRC)]	Zhezdy, Qaraghandy region	
Molybdenum:			
Mining, recoverable content of ore	Kazakhmys PLC facilities:	Locations:	1,000 [2]
	Balkhash complex	Kounrad Mine	
	Karaobinskoye deposit	Karaoba region	
	Sayak deposit	Sayaq region	
Metal	Akchatau molybdenum metal plant	Zhezkazgan region	NA
Natural gas million cubic meters	Companies:	Locations:	20,000 [2]
	CNPC Aktobemunaigaz	Aqtobe	
	Embamunaigaz	Emba region	
	Huricane Kumkol Munai	Aral Sea region	
	Karachaganak Petroleum Operating BV	Northwestern Kazakhstan	
	Mangistaumunaigaz	Mangghhyshlaq Peninsula	
	Kazmunaigaz		
	Tengizchevroil joint venture	Tengiz deposit	
		Zhanazhol deposit	
		Urikhtau deposit	
	North Caspian Operating Company	Kashagana offshore field	
	Uzenmunaigaz	Uzen deposit	
Niobium, metal	Ulba Metallurgical Plant JSC (UMP)	Oskemen	NA
Petroleum:	Companies:	Locations:	80,000,000 [2]
Crude	CNPC Aktobemunaigaz	Aqtobe	
	Embamunaigaz	Emba region	
	Huricane Kumkol Munai	Aral Sea region	
	Karachaganak Petroleum Operating BV	Karachaganak field	
	Kazmunaigaz		
	Mangistaumunaigaz	Mangghhyshlaq Peninsula	
	Uzenmunaigaz	Uzen deposit	

See footnotes at end of table.

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TABLE 2—Continued

KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

(Metric tons unless otherwise specified)

Commodity		Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity[e]
Petroleum—Continued:				
Crude—Continued:		Alibekmola, Ayrankul, Chinarevskoye, Kozhasay, North Buzachi, Sazankurak, Saztyube, and Urikhtau deposits	NA	NA
Do.	42-gallon barrels per day	Tengizchevroil joint venture	Tengiz deposit	NA
Do.	do.	North Caspian Operating Co.	Kashagan offshore field	NA
Refined, crude oil throughput	do.	Atyrau Pavlodar, Shymkent refineries	Atyrau, Pavlodar, Shymkent	427,000 [2]
Phosphate rock		Chilisay mining directorate	Chilisay phosphate deposit	20,000,000 [2]
		Karatau mining and processing complex containing Chulaktau and Zhantas mining and processing enterprises (Kazphosphate LLC)	Karatau phosphorous basin	
Rare-earth metals, products		Irtysh Rare Earths Company, Ltd.	East Kazakhstan	NA
Silver, refined		Facilities:	Locations:	1,000 [2]
		Chimkent metallurgical plants	Shymkent	
		Ridder (Kazzinc JSC)	Ridder	
		Ust-Kamenogorsk (Kazzinc JSC)	Zhezkazgan region	
Tantalum		Ulba Metallurgical Plant JSC (UMP)	Oskemen	NA
Tin		Akchatau mining-beneficiation complex	Akzhaik deposit, Zhezkazgan	700
Titanium:				
Ore, ilmenite		Obukhovskoye, Satpayevskoye, and Shokashsk deposits	NA	30,000
Metal		Ust-Kamenogorsk titanium-magnesium plant	Oskemen	35,000
Uranium, U content		Kazatomprom National Atomic Co. affiliated companies:	Locations:	15,000 [2]
		Akbastau JV	Budenovskoye deposit	
		Appak LLP	Mynkuduk deposit	
		Baiken-U LLP	Khorassan deposit, Kyzylorda Region	
		Betpak Dala JV, consisting of Akdala Mine and Site No. 4 Mine of Inkai deposit	Southern Kazakhstan	
		Karatau LLP	Karatau region	
		Katco JV, consisting of Site No. 1 Yuzhnyi and Site No. 2 Tortkuduk of Moinkum deposit	Southern Kazakhstan	
		Kyzylkum LLP	Khorassan deposit, Kyzylorda Region	
		Mining Group No. 6 LLP	NA	
		Prikaspiskiy ore enrichment center	Aqtau	
		Semizbai-U	Semizbai deposit, interface of Northern Kazakhstan and Akmola	
		Shevchenko	Aqtau	
		Stepnogorskyi mining-chemical complex, Shantobe Mine	Vostok and Zvezdnoe deposits, west of Stepnogorsk	
		Stepnoye Mining Group LLP	NA	
		Taboshara	NA	
		Taukent Mining Chemical Plant LLP	NA	
		Tselinny chemical complex	Stepnogorsk	
		Ulba Metallurgical Plant JSC (UMP)	Oskemen	
		JV Zarechnoye JSC	Zarechnoye deposit, South Kazakhstan	
		Kazatomprom National Atomic Co. mines:		
		Kanzhugan, Moinjum, Uvanas	Chu-Sarysu uranium ore province	
		Northern Karamurun, Southern Karamurun	Srydarya uranium ore province	
		Vostok	Northern Kazakhstan uranium ore province	

See footnotes at end of table.

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TABLE 2—Continued

KAZAKHSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity[e]
Zinc:			
Mining, recoverable, Zn content	Kazakhmys PLC mines:		
	East region:		
	Artemyevskoe Mine	East Kazakhstan	30,200
Do.	Belousovskoe Mine	do.	8,420
Do.	Irtyshskoe Mine	do.	14,700
Do.	Nikolaevskoe Mine	do.	48,700
Do.	Orlovskoe Mine	do.	78,200
Do.	Yubileyno-Snegirikhinskoe Mine	do.	16,500
Do.	Karaganda Region: Abyz Mine	North-central Kazakhstan	20,800
Do.	Kazzinc JSC:		
	Ridder:		
	Ridder-Sokolny Mine	East Kazakhstan	NA
Do.	Shubinsky Mine	do.	2,510
Do.	Tishinsky Mine	do.	79,500
Do.	Shaimerden deposit	North Kazakhstan	1,090,000
Do.	Zyrianovsk:		
	Grekhovsky Mine	East Kazakhstan	240,000
Do.	Maleevsky Mine	do.	203,000
Mining, Zn content of Pb-Zn ore	ShalkiyaZinc N.V.	Kyzlordo Region	100,000
Processing, recoverable, Zn content	Kazakhmys PLC mines:		
	East region:		
	Artemyevskoe Mine	do.	8,580
Do.	Belousovskoe Mine	do.	5,760
Do.	Irtyshskoe Mine	do.	7,610
Do.	Nikolaevskoe Mine	do.	24,200
Do.	Orlovskoe Mine	do.	55,000
Do.	Yubileyno-Snegirikhinskoe Mine	do.	6,190
Do.	Kazzinc JSC:		
	Ridder concentrator	do.	NA
Do.	Shaimerden deposit	North Kazakhstan	72,000
Metal	Kazzinc JSC:		
	Ridder zinc refinery	East Kazakhstan	126,000
Do.	Ust-Kamenogorsk zinc refinery	North Kazakhstan	240,000

[e]Estimated; estimated data are rounded to no more than three significant digits. NA Not available.

[1]Many location names have changed since the breakup of the Soviet Union. Many enterprises, however, are still named or commonly referred to based on the former location name, which accounts for discrepencies in the names of enterprises and that of locations.

[2]Capacity estimate is the total for all enterprises that produce this commodity.

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The Mineral Industry of Kosovo

By Mark Brininstool

On February 17, 2008, the Serbian Province of Kosovo declared its independence after having been under the administration of the United Nation's Interim Administration Mission in Kosovo (UNMIK) since 1999. Kosovo has deposits of aggregates and construction minerals, bauxite, chromium, lead and zinc, lignite, magnesite, nickel, and silver. Almost all industry activities stopped in the late 1990s during fighting between ethnic Albanian guerilla groups and Serbian security forces, and in 2009, the mineral industry was still recovering, and production was limited (Independent Commission for Mines and Minerals, 2005).

Minerals in the National Economy

In 2009, the real gross domestic product (GDP), as estimated by the Ministry of Economy and Finance, increased by 4.4% compared with the GDP in 2008. Exports of base metals and articles of base metals made up about 50.8% of total exports and were valued at about $115 million,[1] which was 33.8% less than that of 2008. The significant decline in the value of base-metal exports was mainly owing to the international financial crisis that decreased demand for exports to European Union countries. Exports also decreased because Bosnia and Herzegovina and Serbia implemented trade embargos against goods from Kosovo at the end of 2008 when customs stamps were converted from UNMIK export stamps to Kosovo customs stamps. The value of exports of mineral products[2] increased by 29.3% to about $33.5 million and made up about 14.8% of total exports. Oil imports made up the majority of imports of mineral products and, owing to lower oil prices in 2009, the total value of imports of mineral products was about $432 million, which was a 17.8% decrease from that of 2008 (Balkan Insight, 2009; Central Bank of the Republic of Kosovo, 2010, p. 12-14, 80-81).

Production

In 2009, production of mineral commodities significantly decreased for most commodities. Production of silica sand decreased by 76%; sand and gravel, by 47%; marl, by 33%; lead and zinc ore, by 25%; and nickel content of ferronickel, by 15%. Limestone production increased by 149%; bentonite production, by 71%; and pumice and volcanic tuff, by 31%. Production of small amounts of lead and zinc concentrate and refined lead and zinc was restarted at the Trepca Complex, which had been shut down owing to damage from fighting in the late 1990s and a lack of investment. The decreases in production were mostly a result of the decreased exports, as discussed above.

[1]Where necessary, values have been converted from European Union euros (€) to U.S. dollars (US$) at the rate of €0.72=US$1.00.

[2]No definition was given by the Central Bank of the Republic of Kosovo as to the exact composition of the category "mineral products," but it is assumed to not include processed metals, which is at least one reason why base-metal exports were of a greater value than mineral product exports.

Structure of the Mineral Industry

Table 2 is a list of major mineral industry facilities.

Commodity Review

Metals

Lead and Zinc.—Kosovo's lead and zinc industry was based on five mines, three concentration plants, and two smelters that made up the Trepca Complex. At the time that the Trepca Complex was fully operational, the Stan Terg Mine was producing about 600,000 metric tons per year (t/yr) of lead-zinc ore, the Artana Mine's designed capacity was about 250,000 t/yr, the Hajvalija Mine was producing about 100,000 t/yr, the combined capacity of the Belo Brdo and the Crnac Mines was about 100,000 t/yr, and the production capacities of the lead smelter at Zvecan and the zinc smelter at Mitrovica were each about 80,000 t/yr. Production capacities in 2009 were unknown but were significantly lower than the figures listed above owing to damage sustained during fighting in 1999 and a lack of investment (Nelles, 2003, p. 8-9; Palairet, 2003, p. 6).

Mineral Fuels

Coal.—Kosovo was a significant regional producer of lignite and, as of 2005 (according to Kosovo's Independent Commission for Mines and Minerals), the country had about 14.7 billion metric tons of proven lignite reserves. The Kosovo Energy Corp. J.S.C. (KEK) produced all Kosovo's lignite at the Bardh and the Mirash open pit mines for use at Kosovo's two thermal powerplants (TPP): Kosovo A and Kosovo B. KEK expected the Bardh and the Mirash Mines to be depleted in 2011 and was therefore working to develop the Sibovc and the Sitnica coalfields. These new fields were expected to supply adequate amounts of coal to Kosovo's two existing TPPs until 2024, when the operating life of both mines was projected to end (Independent Commission for Mines and Minerals, 2005; Kosovo Energy Corp. J.S.C., 2009a, b).

Outlook

Kosovo is expected to remain a modest producer of mineral commodities in the short to medium term, but is likely to continue to increase production as the economy develops and further repairs are made to infrastructure damaged in the conflict in the late 1990s. Further development of the Trepca Complex could make Kosovo a regionally significant producer of lead and zinc, but major investments would be necessary to accomplish this goal.

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References Cited

Balkan Insight, 2009, Kosovo exports plunge in economic crisis: Balkan Insight, November 25. (Accessed September 12, 2009, at http://www.balkaninsight.com/en/main/news/23954.)

Central Bank of the Republic of Kosovo, 2010, Monthly statistics bulletin—December 2009: Central Bank of the Republic of Kosovo, no. 100, April, 102 p. (Accessed June 7, 2010, at http://www.bqk-kos.org/repository/docs/MSB NO. 100.pdf.)

Independent Commission for Mines and Minerals, 2005, Mineral deposits: Independent Commission for Mines and Minerals. (Accessed June 6, 2010, at http://www.kosovo-mining.org/kosovoweb/en/mining/minerals.html.)

Kosovo Energy Corp. J.S.C., 2009a, Division: Kosovo Energy Corp. J.S.C. (Accessed October 1, 2009, at http://www.kek-energy.com/kek-cmnPg.jsp?mID=170&cat=161&l=2.)

Kosovo Energy Corp. J.S.C., 2009b, Profile: Kosovo Energy Corp. J.S.C. (Accessed October 1, 2009, at http://www.kek-energy.com/kek-cmnPg.jsp?mID=162&cat=161&l=2.)

Nelles, Paul, 2003, The Trepca goal: United Nations Interim Administration Mission in Kosovo, November, 14 p. (Accessed January 22, 2010, at http://www.esiweb.org/pdf/esi_mitrovica_trepca_id_1.pdf.)

Palairet, Michael, 2003, Trepca, 1965-2000: European Stability Initiative, December, 98 p. (Accessed January 22, 2010, at http://www.esiweb.org/pdf/esi_document_id_62.pdf.)

TABLE 1

KOSOVO: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007	2008	2009
METALS						
Ferroalloys, ferronickel (38% Ni), gross weight[e]		--	--	2,100	18,500	15,600
Lead-zinc:						
Ore, gross weight:		12,200	63,517	69,953	139,670	105,157
Lead content of ore		530 r	2,760 r	3,040 r	6,080 r	4,570
Zinc content of ore		430 r	2,230 r	2,460 r	4,900 r	3,690
Concentrate, gross weight		--	--	--	--	9,737
Metal:						
Pb, refined		--	--	--	--	4,250
Zn, refined		--	--	--	--	5,487
Nickel:						
Ore, wet		--	--	145,882	292,362 r	316,520
Ni content of ore (1.25%)		--	--	1,820	3,660	3,960
Ni content of ferronickel[e]		--	--	800	7,100	6,000
INDUSTRIAL MINERALS						
Cement[e]	thousand metric tons	450	450	470	590	600
Clay, bentonite[3]		--	--	16,200	20,800	35,600
Limestone	cubic meters	NA	NA	NA	1,917,196	4,776,127
Marl	do.	264,814	254,386	260,707	322,007	215,259
Pumice and related materials, volcanic tuff[e]	do.	NA	NA	NA	45,005	58,788
Sand and gravel, excluding glass sand	do.	14,894	34,268	41,621	44,498 r	23,754
Silica sand (glass sand)	do.	NA	NA	NA	27,325	6,550
MINERAL FUELS AND RELATED MATERIALS						
Lignite	thousand metric tons	6,391	6,532	6,715	7,885 r	7,839

[e]Estimated; estimated data are rounded to no more than three significant digits. [r]Revised. do. Ditto. NA Not available. -- Zero.

[1]Table includes data available through June 11, 2010.

[2]In addition to commodities listed, other aggregates and construction materials were believed to have been produced, but available information is inadequate to make reliable estimates of output.

[3]Estimate based on reported production in cubic meters: 2007—27,614; 2008—35,382; and 2009—60,501.

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TABLE 2
KOSOVO: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Bauxite	Bauxite Mine Volljak (Government owned)	Grebnik Mine, about 50 kilometers east of Pristina and 17 kilometers north of Orahovac	NA
Cement	Sharr Beteiligungs GmbH (Holcim Group)	Hani Elezit, on border with Macedonia	720
Coal, lignite	Kosovo Energy Corp. J.S.C. (Government owned)	Bardh and Mirash Mines, just west of Pristina	NA
Kaolin	Kaolini LLC	Karacevo, Gjilan municipality	NA
Lead and zinc:			
Ore	Trepca Complex (Government owned)	Artana Mine at Novo Brdo	NA
Do.	do.	Stan Terg Mine	NA
Do.	do.	Belo Brdo Mine, northern Kosovo	NA
Do.	do.	Hajvalia Mine, 8 kilometers southeast of Pristina	NA
Do.	do.	Crnac Mine, northern Kosovo	NA
Concentrate	do.	Concentrator at Tuneli i Pare near Mitrovica	NA
Do.	do.	Concentrator at Leposavic in northern Kosovo	NA
Do.	do.	Concentrator at Kizhnica, about 8 kilometers southeast of Pristina	NA
Metal:			
Lead	do.	Lead smelter at Zvecan	NA
Zinc	do.	Zinc smelter at Mitrovica	NA
Magnesite	XIM Strezoc Magnesite Mine LLC ("Iminggrup mgo" Sh.p.k.)	Mine and processing plant in Strezovce, Kamenica municipality	NA
Do.	Mine and Industry of Magnesite Goleshi LLC ("Iminggrup mgo" Sh.p.k.)	Magure, Lipljan municipality	NA
Nickel:			
Ore	Ferronikeli (Cunico Resources NV)	Mines at Chikatovo (Dushkaja and Suke Mines) and Glavitca	NA
Metal[1]	do.	Ferronickel plant at Gllogovac, about 20 kilometers west of Pristina	12

Do., do. Ditto. NA Not available.
[1]Nickel in ferronickel.

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THE MINERAL INDUSTRY OF KYRGYZSTAN

By Richard M. Levine

During the Soviet period, Kyrgyzstan's mineral industry was based on the extraction of antimony, mercury, rare-earth elements, and uranium. The country was the main producer of mined mercury and of mercury and antimony metal during the Soviet period. By 2009, production of antimony and mercury was being conducted at a much lower level and the production of uranium and rare earths had ceased. The Kara-Balta mining and metallurgical complex near Bishkek, which used to process uranium until the collapse of the Soviet Union, had switched to processing as much as 25 metric tons per year (t/yr) of gold and silver. As of 2009, however, Kara-Balta was again processing uranium at the refurbished Kara-Balta mill.

Kyrgyzstan does not possess large oil and gas reserves, but did produce some oil and gas. Coal mining had been conducted there since the early 1900s when Kyrgyzstan was the main supplier of coal in the Central Asia region, but coal production was no longer substantial and provided less than 25% of the country's coal consumption. Following the dissolution of the Soviet Union, the country's leading mineral sector became the gold mining sector with the development of the Kumtor gold deposit by Canada's Cameco Corp., which concluded an agreement for the development of Kumtor with the Kyrgyz Government in 1994. In 2004, all Cameco's assets were transferred to Centerra Gold Inc. of Canada.

Production

In 2009, the Kyrgyzstan gross domestic product (GDP) increased by 2.3%, but industrial production decreased by 6.4% compared with that of 2008 (Interfax Russia & CIS Statistics Weekly, 2010). In terms of value, gold was the leading mineral commodity produced in Kyrgyzstan. The output of gold in 2009 decreased by about 1 metric ton (t) at the Kumtor deposit and by less than 0.2 t at the Makmal deposit. Production of antimony metal increased. In 2009, production of uranium concentrate increased by 130% to 2,574 t compared with 1,096.5 t in 2008 (M-G-N Capital, 2010b, p. 4). Data on mineral production are in table 1.

Structure of the Mineral Industry

Centerra Gold owned 100% of the Kumtor gold mine through its wholly owned subsidiary Kumtor Gold Co. Besides Centerra Gold, the country's main mining enterprises were the Kadamzhay antimony mining and metallurgical complex, the Makmal gold mining complex, and the Khaydarkan mercury mining and metallurgical complex. The Makmal gold mining enterprise was managed by the Kyrgyzaltyn Joint Stock Co., which was wholly owned by the Government.

Commodity Review

Metals

Antimony and Fluorspar.—The Ministry of Natural Resources reported that in 2009 the antimony plant of the Kadamzhay complex produced 918 t of antimony and antimony compounds, which was 2.8 times more than in 2008. Plans for 2010 called for Kyrgyzstan to produce 1,740 t of antimony and antimony compounds (M-G-N Capital, 2010a, p. 4).

In 1990, Kyrgyzstan had been the third ranked producer of antimony in the world after China and Bolivia, but by 2009, its deposits were significantly depleted. The Kadamzhay antimony mining and metallurgical complex was a vertically integrated antimony production complex that mined the Kadamzhay and the Terek deposits. The complex, where metallic antimony and compounds were produced, contained two mines (the Kadamzhay and the Terek-Sayskiy), beneficiation plants, and the Kadamzhay metallurgical plant. Antimony produced at Khaydarkan as a result of processing antimony-fluorspar concentrate was sent to the Kadamzhay metallurgical facility for processing, and the fluorspar concentrate was sold to consumers.

With the development of large antimony reserves in Russia and Tajikistan, ore production at Kadamzhay decreased. The Kadamzhay complex did not operate in 2004 and 2005, and in 2005, it was privatized. The new owners engaged in investing in technically reequipping the plant and in infrastructure development for the mines. From mid-2005 until November 2006, Kadamzhay ceased producing antimony and other products because it had not been able to obtain raw material supplies from the Anzob mining and beneficiation plant in Tajikistan, which had been its main raw material supplier.

To resolve its raw material supply problem, in 2006, the Kadamzhay metallurgical plant oriented its production to processing concentrate from Russia. In the fall of 2006, Kadamzhay began receiving its supplies of raw materials from the Chita region in Russia, which enabled the plant to resume stable operations. Plans called for the Kadamzhay plant to produce between 3,000 and 5,000 t/yr of antimony metal and its compounds. Despite more than 70 years of development, Kadamzhay still had a large quantity of remaining reserves. These reserves, however, had not yet been reevaluated on the basis of market economy criteria rather than the criteria that had been used in Soviet times. The remaining reserves at the Khaydarkan deposit were reportedly 107,700 t of antimony and 1.071 million metric tons (Mt) of fluorspar reserves (Zubkov, 2007; United Nations Environmental Programme, 2009).

Gold.—Kyrgyzstan had two gold mining enterprises—Kumtor Gold and Kyrgzyaltyn. Kumtor was located about 350 kilometers (km) southeast of the capital Bishkek and about 60 km north of the border with China. The Kumtor gold deposit is located in the southern Tien Shan metallogenic belt, which is a major suture that traverses Central Asia, from Uzbekistan in

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the west through Tajikistan and Kyrgyzstan into northwestern China, which is a distance of more than 1,500 km. A number of mesothermal-type gold deposits occur along this belt. Kumtor is the largest gold mine in Central Asia to be operated by a Western-based company.

From 1997 to 2007, Kumtor produced a total of more than 6 million troy ounces (about 187 t) of gold. In 2008, gold production at Kumtor decreased to 556,000 troy ounces (about 17.3 t). In 2009, production at Kumtor again decreased to 525,000 troy ounces (about 16.3 t) of gold. In the fourth quarter of 2009, however, Kumtor set a quarterly production record, producing more than 247,000 troy ounces (about 7.7 t) of gold (Centerra Gold Inc., 2010).

The Ministry of Natural Resources reported that Kyrgyzaltyn's gold production decreased to 647 kilograms (kg) in 2009 compared with that of 2008, or by 22.1%. Kyrgyzaltyn projected that it would produce 882.3 kg of gold in 2010 (M-G-N Capital, 2010c, p. 4).

Mercury.—The Khaydarkan mercury mining and metallurgical complex mined the Khaydarkan and the Novoye deposits. The remaining reserves at the Khaydarkan deposit were reportedly 11,000 t of mercury, and at the Novoye deposit, 5,500 t. These deposits were also reported to contain 107,700 t of antimony and 1.071 million metric tons (Mt) of fluorspar reserves. The Khaydarkan complex contained two underground mines, a beneficiation plant, and metallurgical processing facilities. Previous to 2005, Khaydarkan had been producing about 500 to 600 t/yr of mercury, but this amount decreased to 304 t in 2005 (United Nations Environmental Programme, 2009).

The majority of the remaining reserves at Khaydarkan were of complex ores from which it was more difficult to extract mercury. Significant mercury reserves remain at deeper depths at Khaydarkan, but investment has not been forthcoming to allow for their exploitation (United Nations Environmental Programme, 2009).

Besides Khaydarkan, there had historically been two other mercury mining sites in the region (Chonkoy and Chauvay), which produced 9,000 t of mercury before they were closed in the early 1990s. Khaydarkan remained the only mercury mining enterprise in the world that continued to sell its output abroad, and it remained the only operation that supplied primary mined mercury to the global marketplace. Since it began operations, the Khaydarkan complex was estimated to have produced a total of more than 36,000 t of mercury. The mercury mine and smelter date from 1941 when mine equipment and infrastructure were relocated at Khaydarkan following the evacuation of industrial facilities from Ukraine to Khaydarkan during World War II. The Khaydarkan site is considered remote as it is located in the mountains of southwestern Kyrgyzstan and reached by a narrow road over a 2,300-meter pass. Mercury production in 1941 was less than 100 t and peaked in the late 1980s at almost 800 t. In 2008 (the latest year for which data were available), Kyrgyzstan produced less than 300 t (United Nations Environmental Programme, 2009).

The main reason that Khaydarkan was the only enterprise still mining mercury for the global market was because of the economic difficulties Kyrgyzstan faced, particularly in the region where the mine is located, which made the country reluctant to close the mine without alternative employment for the population. The company that managed the complex had been struggling with fluctuating mercury prices and continuous technical difficulties, such as low ore grades and flooding of shafts with underground water. A number of times, Khaydarkan, which was state-owned, had to request subsidies and state support to continue its operations; initial efforts to privatize the mine were not successful (United Nations Environmental Programme, 2009).

Although the Khaydarkan complex was important to the local community as a source of income, it was recognized that mercury mining poses environmental risks. Mercury contamination from Khaydarkan had been a problem for about 70 years. High mercury concentrations are found in slag, sludge, and tailings from the mine. These significantly affected the town, surrounding farmland, and waterways, all of which showed elevated mercury concentrations that often exceeded Kyrgyzstan's national standards. Environmental protections were constrained, and monitoring and reporting were limited.

Owing to waste deposits and contaminated agricultural soils, pollution would continue even if production stopped. Limited studies have suggested that human health may have been affected, as some workers had experienced health problems and some children had suffered neurological damage. Concerns had been raised about mercury dispersal from Khaydarkan as rivers flow from Kyrgyzstan to its neighbors Tajikistan and Uzbekistan and into Kyrgyzstan's fertile Fergana Valley. Most of the mercury and other pollutants that had entered the environment from the Khaydarkan complex consisted of gaseous emissions from the mercury smelter or from waste streams generated during mining and processing of ore. More than 13 Mt of slag, 4 Mt of tailings, and several million tons of waste rock were deposited in close proximity to the town and were posing significant risks of instability and pollution. There was also a sludge pond that contained several thousand metric tons of highly concentrated mercury wastes that originated from the mercury purification process. Water was draining from all these waste sites, and the water was used for irrigation or was drunk by cattle in the area (United Nations Environmental Programme, 2009).

In 2009, the United Nations Environment Programme (UNEP) Governing Council prepared a legally binding instrument on mercury to reduce the global supply of and demand for mercury to protect human health and the environment, but the instrument would also take into account the circumstances of individual countries. Kyrgyzstan, which was the only country with a mine that was still supplying mercury abroad, faced upcoming negotiation on the global legally binding instrument (United Nations Environmental Programme, 2009). On October 20, 2009, the State Secretary for Industry of the Government of Kyrgyzstan announced the conditional closure of Khaydarkan during a meeting in Bangkok, Thailand. The meeting was led and organized by the UNEP and was the culmination of 2 years of work with the United Nations Institute for Training and Research (UNITAR), in partnership with UNEP and the Governments of the United States and Switzerland. The decision was in line with a UNEP project, entitled "Development of an Action Plan to Address Primary Mercury

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Mining in Kyrgyzstan," which consisted of intensive activities to assist all ministries, agencies, and stakeholders outside of the Kyrgyzstan Government in reaching a decision on closure (United Nations Institute for Training and Research, 2009).

Rare Earths.—Open pit mining of rare earths had taken place in Kyrgyzstan from 1960 through 1991 at the Kutessai II deposit, and the majority of rare-earth reserves still remained. Of the remaining rare-earth reserves, 54.5% was light rare earths of the cerium group and 43.7% was heavy rare earths of the yttrium group. The complex had produced up to 120 types of rare-earth products, which included oxides of yttrium, oxides of lanthanum and neodymium, dioxides of cerium, and rare-earth alloys. During the beneficiation process, lead and molybdenum concentrates were also produced and sold. In 1995, the chemical-metallurgical plant was privatized and transformed to produce high-purity silicon (Zubkov, 2007).

In December 2009, Stans Energy Corp. of Canada purchased the Kutessai II deposit from the Kyrgyzstan Government. Stans proposed to conduct a feasibility study on restarting production at Kutessai II and to have a resource estimate based on the Australasian Joint Ore Reserves Committee (JORC) resource criteria prepared in conjunction with the feasibility study. Stans envisioned that the Kutessai II deposit could be the first major heavy rare-earth producing deposit outside of China.

The Kutessai II deposit had been a major supplier of rare earth for the Soviet Union. Between 1958 and 1991, ore was mined at the Kutessai II deposit from an open pit from which 22,109 t of rare-earth metals (REM) was produced from 5,454,400 t of ore at an apparent grade for REM of 0.41% in the ore and a recovery rate of 64.5%. During the Soviet era, the Kutessai II deposit was producing at a rate of 300,000 t/yr of ore, which was equivalent to 750 t/yr of REM after recovery losses. Stans intended to increase production to 2,000 t/yr, which would require extensive upgrading of the Soviet era processing facilities still at the site and the installation of new state-of-the-art equipment.

In 1996, the Kyrgyzstan State Reserve reported that remaining rare-earth resources were estimated to be 20,228,000 t at an ore grade for REM of from 0.22% to 0.30%. According to reserve estimates that had been conducted at Kutessai II at an unspecified time prior to its purchase by Stans, dysprosium represents 6.7% of the total rare earths; terbium, 1.15%; and neodymium, 8.5%. According to these estimates, the ore grades for dysprosium and terbium were among the highest in the world (Burns, 2010).

Mineral Fuels and Related Materials

Natural Gas.—Kyrgyzstan was planning to purchase gas from Turkmenistan starting in 2012 or 2013, which Kyrgyzstan planned to obtain from a newly inaugurated Turkemenistan-China gas pipeline. This new supply would help Kyrgyzstan reduce its dependence on Uzbekistan, which in 2009 was Kyrgyzstan's sole source of imported natural gas. Also, the price of gas from Turkmenistan was expected to be lower than gas from Uzbekistan (M-G-N Capital, 2010d, p. 2).

Uranium.—The Kara-Balta uranium mill's production in 2009 amounted to 2,574 t of uranium compared with 1,096.5 t of uranium produced in 2008. In 2010, the plant planned to produce 2,000 t of uranium (AKIpress News Agency, 2010). The Kara-Balta mining and metallurgical complex was commissioned in the 1950s for extracting and processing uraniferous ores. During the Soviet era, the Kara-Balta mining and metallurgical complex processed uranium concentrate from deposits in Kyrgyzstan and Kazakhstan for use in Soviet nuclear powerplants. The Kara-Balta plant also processed other metals besides uranium and refined gold. The Kara-Balta complex contained a hydrometallurgical facility near Bishkek. The annual uranium production capacity of the facility had been listed at 3,600 t of uranium (U) (WISE Uranium Project, 2009).

In 1991, following Kyrgyzstan gaining independence, the Kara-Balta plant ceased processing uranium because of a lack of raw material. Uranium mining had ceased in Kyrgyzstan, and Kara-Balta did not process uranium again until 1994 when it reached an agreement with Kazakhstan to process uranium concentrate from the Stepnoye and the Tsentral'noye mining directorates in Kazakhstan into about 450 t/yr of U_3O_8. In 2000, the Russian Ministry of Atomic Energy restored ties with Kara-Balta, and in July 2000, Kyrgyzstan agreed to a joint-venture arrangement with Kazakhstan and Russia in which additional uranium concentrate from Kazakhstan's Zarechnoye deposit would be processed at Kara-Balta and supplied to the Russian nuclear industry. In 2004, Kazakhstan stopped supplying uranium to Kara-Balta, which caused uranium processing there again to cease.

Ural Platina Holding, which was part of the Russia-based resource investment company Renova Group, was the majority owner of the Kara-Balta plant. In March 2007, the Kyrgyzstan Government accepted a tender from Renova for the Government's 72% stake in the company, which led to an agreement in October 2008 with the Kazakhstan-based Eurasian Development Bank (EDB) to provide $150 million to develop the mill and properly emplace 50 years of tailings accumulation (World Nuclear Association, 2009).

In 2007, Nimrodel Resources Ltd. acquired 100% ownership of Linia Prava Uranium (LPU). LPU is a joint stock company, registered in Kyrgyzstan, that holds a 90% interest in four exploration licenses granted for the Batkenskaya Oblast' in the southern Fergana Valley in southwestern Kyrgyzstan. The licenses cover an area of more than 3,800 square kilometers that LPU had been exploring actively since 2005. LPU had an office in Bishkek with a staff that included geologists, field support staff, and logistical support and office personnel. In January 2008, LPU acquired a license to explore a 48-square-kilometer portion of the Mailuu-Suu district, which was a significant uranium mining area from 1946 to 1967. The area of the license included five nonworking mines, 23 tailings dams, and 13 mullock sites (mine waste heaps). Geologic surveying was to be conducted around the 5 mines to investigate prospective uranium in the region. A program to drill tailings also was carried out in March and April 2008, and mineralogical and metallurgical studies were to be done to develop parameters for a production plant. On October 23, 2008, Nimrodel Resources Ltd. announced that "In the context of the prevailing global economic uncertainty and current uranium prices, the investigations carried out to date do not support the development of the reprocessing of the Mailuu Suu Tailings in its current form. However, the scoping study

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also established financial parameters and attractive low-cost, modular reprocessing technology, which could be readily applied to large quantities of tailings in diverse locations" (Nimrodel Resources Ltd., 2009; WISE Uranium Project, 2009).

Outlook

Kyrgyzstan appears to have the potential to resume mining and processing rare earths and uranium, and the country could become a source of rare earths for world markets. According to Kyrgyzstan's Ministry of Natural Resources, investor activity in Kyrgyzstan was concentrated in areas of gold, natural gas, oil, and uranium exploration (M-G-N Capital, 2010e, p. 5).

References Cited

AKIpress News Agency, 2010, Kyrgyzstan increases uranium production in 2009: Encyclopedia.com, February 1. (Accessed June 3, 2010, at http://www.encyclopedia.com/doc/1G1-217993342.html.)

Burns, Stuart, 2010, Kyrgyzstan holds potential for major heavy rare earth supplies: MetalMiner, April 27. (Accessed June 6, 2010, at http://agmetalminer.com/2010/04/27/kyrgyzstan-holds-potential-for-major-heavy-rare-earth-supplies/.)

Centerra Gold Inc., 2010, Kumtor—Overview: Centerra Gold Inc. (Accessed June 4, 2010, at http://www.centerragold.com/properties/kumtor/.)

Interfax Russia & CIS Statistics Weekly, 2010, Summary socio-economic survey of CIS and Baltic countries: Interfax Russia & CIS Statistics Weekly, issue 5-6, January 30-February 12, p. 4.

M-G-N Capital, 2010a, Weekly update—2009 antimony output increases 3.8 Times: M-G-N Capital, February 1-5, 7 p. (Accessed June 3, 2010, at http://www.mgncapital.com/weekly/24_e.pdf.)

M-G-N Capital, 2010b, Weekly update—Increase in uranium production in Kyrgyzstan in 2009: M-G-N Capital, February 1-5, 7 p. (Accessed June 3, 2010, at http://www.mgncapital.com/weekly/24_e.pdf.)

M-G-N Capital, 2010c, Weekly update—Kyrgyzaltyn increases gold production by 28.5% in 2009: M-G-N Capital, February 1-5, 7 p. (Accessed June 3, 2010, at http://www.mgncapital.com/weekly/24_e.pdf.)

M-G-N Capital, 2010d, Weekly update—Kyrgyzstan plans to purchase Turkmen gas in 2012: M-G-N Capital, February 1-5, 7 p. (Accessed June 3, 2010, at http://www.mgncapital.com/weekly/24_e.pdf.)

M-G-N Capital, 2010e, Weekly update—Most investments in gold, oil, natural gas and uranium; M-G-N Capital, February 1-5, 7 p. (Accessed June 3, 2010, at http://www.mgncapital.com/weekly/24_e.pdf.)

Nimrodel Resources Ltd., 2009, Linia Prava Uranium—Kyrgyzstan: Nimrodel Resources Ltd. (Accessed February 27, 2009, at http://www.nimrodel.com.au/kyrgyzstan.cfm.)

United Nations Environmental Programme, 2009, Khaidarkan mercury—Addressing primary mercury mining in Kyrgyzstan: United Nations Environmental Programme, 36 p. (Accessed June 4, 2010, at http://www.grida.no/_res/site/file/publications/MercuryReport_scr.pdf.)

United Nations Institute for Training and Research, 2009, Kyrgyz Government announces conditional closure of the world's last remaining exporting mercury mine: United Nations Institute for Training and Research. (Accessed June 4, 2010, at http://www.unitar.org/kyrgyz-government-announces-conditional-closure-world-s-last-remaining-exporting-mercury-mine.)

WISE Uranium Project, 2009, New uranium mining projects—Asia: World Information Service on Energy, February 24. (Accessed February 27, 2009, at http://www.wise-uranium.org/upasi.html.)

World Nuclear Association, 2009, Uranium in Central Asia—Kyrgyzstan: World Nuclear Association. (Accessed June 7, 2010, at http://www.world-nuclear.org/info/inf118_centralasiauranium.html.)

Zubkov, V.P., 2007, Syr'yevaya baza, sostoyaniye i perspektivy razvitya gornopromyshlennogo kompleksa Kykrgyzskoy Respubliki [The raw material base, condition, and perspectives for the development of the mining-industrial complex of the Kyrgyz Republic]: Gornyy Zhurnal [Mining Journal], no. 10, p. 38-42.

TABLE 1
KYRGYZSTAN: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007	2008	2009
METALS						
Antimony:						
Mine output, Sb content[e]		10	50	10	10	10
Metal and compounds		800 r	100 r	150 r,e	242 r	918
Gold, mine output, Au content	kilograms	16,751	10,721	10,559	18,132	16,950
Mercury:						
Mine output, Hg content[e]		200	250	250	250	250
Metal	kilograms	303,500	168,900	331,500	290,000 r,e	320,000 e
Molybdenum, mine output, Mo content[e]		250	250	250	250	250
INDUSTRIAL MINERALS						
Cement		972,800	1,059,900	1,229,500	1,218,100	1,100,000 e
Fluorspar, concentrate[e]		4,000	4,000	4,000	4,000	4,000
Kaolin[e]		400,000	400,000	400,000	400,000	400,000
Lime, dead-burned		8,500	9,900	12,900	8,700 r	8,000 e
Salt[e]		1,100	1,100	1,100	1,100	1,100
Sands	cubic meters	388,100	514,800	597,900	836,200	800,000 e
MINERAL FUELS AND RELATED MATERIALS						
Coal		335,500 r	321,300 r	395,500 r	491,800 r	605,000
Natural gas	thousand cubic meters	25,100	19,400	15,000	17,300	17,300 e
Petroleum, crude		97,200	70,900	68,500	71,000	71,000 e
Uranium, processed, U content		NA	NA	NA	1,097	2,574

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. NA Not available.

[1]Table includes data available through January 31, 2011.

[2]In addition to the commodities listed, Kyrgyzstan is believed to produce a number of other mineral commodities, including clays, gypsum, sand and gravel, and silver, but information is not adequate to estimate production.

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TABLE 2

KYRGYZSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

(Metric tons unless otherwise specified)

Commodity		Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity[e]
Antimony:				
Sb content of ore		Kadamzhay complex (ATF Invest, a subsidiary of ATF Bank of Kazakhstan, 70.4%): Kadamzhay Mine Terek-Sayskiy Mine	Kadamzhayskiy Rayon	2,400 [2]
		Khaydarkan mining and metallurgical complex	Khaydarkan region	
Metal and compounds		Kadamzhay metallurgical facility (ATF Invest, a subsidiary of ATF Bank of Kazakhstan, 70.4%)	Kadamzhayskiy Rayon	28,000
Cement		Kantskiy cement plant	Kant	1,500,000
Coal		Seven underground mines and five open pits, which include the following deposits: Almalyk, Dzhergalan, Kara-Kiche-Kok-Yangak, Kyzyl-Kiya, Sulyukta, and Tashkumyr	Southwestern, central, and northeastern parts of the country	2,200,000 [2]
Fluorspar, concentrate		Khaydarkan mining and metallurgical complex	Khaydarkan deposit	5,000
Gold:				
Au content of ore		Kumtor Gold Co. (Centerra Gold Inc.)	Kumtor deposit	22
Do.		JCS JerooyAltyn (joint venture of Kyrgyzaltyn Joint Stock Co. and Visor Holding)	Dzher-Uy deposit (open pit)	4 [3]
Do.		Makmal gold mining enterprise (Kyrgyzaltyn Joint Stock Co.)	Makmal deposit	3
Do.		JCS JerooyAltyn (joint venture of Kyrgyzaltyn Joint Stock Co. and Visor Holding)	Dzher-Uy deposit (underground)	2 [3]
Do.	kilograms	Solton-Sary Mine	Narynskaya Oblast'	500
Do.		Altynken LLC (Summer Gold PLC, 60%, and Kyrgyzaltyn Joint Stock Co., 40%)	Taldybulak Levoberezhny deposit	NA
Do.		Talas Copper Gold LLV (joint venture of Gold Fields Orogen Holding Ltd. and Orsu Metals Corp.)	Exploration activity, Talas Valley including the Barkol, Kenash, Korgontash, and Taldybulak-Talas deposits	NA
Do.		Talas Gold Mining Company CJSC	Dzheryuy-Bashi, Pereval; Talasskaya Oblast'	NA
Refined		Kara-Balta refinery	Chuyskaya Oblast'	22
Mercury:				
Hg content of ore		Khaydarkan mining and metallurgical complex	Chauvi, Chonkoy, Khaydarkan, and Novoye deposits	700 [2]
Metal		do.	Khaydarkan, Batkenskaya Oblast'	1,000
Molybdenum, for nonmetallurgical uses		Kara-Balta mining and metallurgical complex	NA	NA
Do.		Molibden Joint Stock Co.	Chuyskaya Oblast'	NA
Natural gas	million cubic meters	OJSC Kyrgyzneftegaz	Approximately 300 wells; Changyr-Tash Chigirchik Pereval, Izbaskentskoye, Kara-Agach, Mayluu-Suu, Susahoye, and Togap-Beshkenskoye deposits	100 [2]
Petroleum:				
Crude oil		do.	do.	150,000
Refined products	42-gallon barrels	Kyrgyz Petroleum Co. (OJSC Kyrgyzneftegaz, 50%, and Petrokyrgyzstan, 50%)	Dzhalal-Abadskaya Oblast'	3,600,000
Rare earths:				
Ore		Aktyuzskiy mining directorate	Kutessai II and Aktyuz-Boordu deposits	300,000
Rare-earth metals		Kyrgyz chemical and metallurgical plant	Orlovka	800
Silver		Karagoyskoye deposit	Oshskaya Oblast'	NA
Do.		Kumyshtag deposit	Talasskaya Oblast'	NA

See footnotes at end of table.

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TABLE 2—Continued
KYRGYZSTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity[e]
Tin	Enil'chek JSC mining enterprise	Atdzhaylau deposit	150
Do.	do.	Trudovoye deposit	350
Do.	Tyanshanolovo mining and beneficiation complex	Sary-Dzhas field	NA
Do.	Uchkoshkon deposit	do.	NA
Tungsten	Enil'chek JSC mining enterprise	Atdzhaylau deposit	90
Do.	do.	Trudovoye deposit	95,600
Uranium, processed	Kara-Balta uranium mill (Renova Group)	Zarechnoye deposit, Chuyskaya Oblast'	3,600
Do.	Linia Prava Uranium (LPU) (Nimrodel Resources, 100%)	Exploration activity, Southern Fergana Valley, Batkenskaya Oblast'	NA

[e]Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.
[1]Many location names have changed since the breakup of the Soviet Union. Many enterprises, however, are still named or commonly referred to based on the former location name, which accounts for discrepancies in the names of enterprises and that of locations.
[2]Capacity estimate is the total for all enterprises that produce this commodity.
[3]Inactive.

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The Mineral Industry of Latvia

By Richard M. Levine

Latvia had the Baltic States' only steel mill, JSC Liepajas Metalurgs. Other mineral commodity production was confined to industrial minerals used in construction, peat extraction, and the production of a small amount of natural gas.

Ports in Latvia handled about 62 million metric tons (Mt) of cargo in 2009, which was a 2.6% decrease compared with that of 2008. The volume of bulk cargo handled decreased by 3.9% to 29.1 Mt, including chemical cargo (which decreased by 35.1% to 3.1 Mt), although the volume of coal increased by 5% to 19.2 Mt. The volume of tanker cargo handled at the ports increased by 1.7% to 24.6 Mt, which included a 64.7% decrease in oil to 623,300 metric tons and a 9.7% increase in oil products to 22.9 Mt (Interfax Russia & CIS Statistics Weekly, 2010a).

Latvia had three large and seven small ports. In 2009, the Freeport of Riga handled the most cargo (29.7 Mt), which was a 0.6% increase from the amount handled in 2008, followed by the Free Port of Ventspils (26.6 Mt), which was a 6.8% decrease, and the Port of Liepaja (4.4 Mt), which was a 4.6% increase (Interfax Russia & CIS Statistics Weekly, 2010a). The Freeport of Riga handled such cargo as mineral fertilizers, petroleum products, and various metals. About 80% of the products handled were transshipped from or to the Commonwealth of Independent States (Freeport of Riga Authority, 2011). The Port of Liepaja handled among its mineral product cargo mainly metals and mineral fertilizers.

Ventspils Nafta Terminal LTD was the Baltic Sea region's leading oil and petroleum product transshipment terminal. Crude oil and petroleum products were received by pipeline and railways. The tank farm capacity of the enterprise exceeded 1 million cubic meters, which enabled the clients of the terminal to store products in case there was no immediate transshipment possibility owing to adverse conditions, such as weather, or in expectation of a better market price. The terminal also included among its services chemical analysis of oil and petroleum products in the company laboratory (Free Port of Ventspils Authority, 2010). In 2009, Ventspils handled 17.37 Mt of tanker cargo, which was a 2.8% decrease from the amount handled in 2008 and included 16.05 Mt of petroleum products. In 2009, Ventspils also handled 1.1 Mt of mineral fertilizers and 5.23 Mt of coal (Interfax Russia & CIS Statistics Weekly, 2010b).

Production

Latvia's gross domestic product (GDP) increased by more than 10% per year during 2006 and 2007, but in 2008 as the world economy went into a downturn, the country entered a severe recession, which was fueled by its large debt exposure and unsustainable current account deficit. Latvia's GDP decreased by nearly 18% in 2009 compared with that of 2008 (U.S. Central Intelligence Agency, 2010).

A large percentage of data on Latvia's production of mineral commodities was withheld by the country. As a result, production data for a number of commodities in table 1 are estimated based on past reported production and general economic data.

Structure of the Mineral Industry

The Ports of Riga and Ventspils operated as freeports and the Port of Liepaja was part of the Liepaja Specialized Economic Zone. The country's steel mill, Liepajas Metalurgs, which was the country's main mineral industry enterprise, was a public joint stock company (JSC Liepajas Metalurgs, 2009, p. 5).

Commodity Review

Metals

Iron and Steel.—In 2007, Liepajas Metalurgs started a modernization program for its production facilities. The main goal of modernization was to move away from the use of economically less profitable open hearth furnaces, which would be replaced in 2011 by electric arc furnace and ladle furnace technology. Steel production using the new technology was planned to commence in autumn 2011 and would enable Liepajas Metalurgs to increase its capacity by one-third to 850,000 metric tons per year (t/yr) from 550,000 t/yr of steel. On December 28, 2010, Liepajas Metalurgs, announced that it had closed the last of its three open hearth furnaces, which had been operating since 1965 (Steel Orbis, 2010).

References Cited

Freeport of Riga Authority, 2011, Facts & figures: Freeport of Riga Authority. (Accessed August 17, 2011, at http://www.rop.lv/en/about-port/facts-a-figures.html.)

Free Port of Ventspils Authority, 2010, Terminals: Free Port of Ventspils Authority. (Accessed January 10, 2010, at http://www.portofventspils.lv/en/terminals.)

Interfax Russia & CIS Statistics Weekly, 2010a, Latvian ports handled 61.98 million tonnes of cargo in 2009, down 2.6% from 2008: Interfax Russia & CIS Statistics Weekly, issue 3, January 16-22, p. 6.

Interfax Russia & CIS Statistics Weekly, 2010b, Latvia's Ventspils port handled 26.6 million tonnes of cargo in 2009, down 6.8% from 2008: Interfax Russia & CIS Statistics Weekly, issue 3, January 16-22, p. 6.

JSC Liepajas Metalurgs, 2009, Quarterly report for 9 months of the year 2009: JSC Liepajas Metalurgs, 23 p. (Accessed August 17, 2011, at http://www.nasdaqomxbaltic.com/upload/reports/lme/2009_q3_en_uni_00_ias.pdf.)

Steel Orbis, 2010, Latvia's Liepājas Metalurgs closes the last of its three open hearth furnaces: Steel Orbis, December 31. (Accessed January 10, 2011, at http://www.steelorbis.com/steel-news/latest-news/latvias-lieppjas-metalurgs-closes-the-last-of-its-three-open-hearth-furnaces-574964.htm.)

U.S. Central Intelligence Agency, 2010, Latvia, *in* The world factbook: U.S. Central Intelligence Agency, December 29. (Accessed January 13, 2011, at https://www.cia.gov/library/publications/the-world-factbook/geos/lg.html.)

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TABLE 1

LATVIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons)

Commodity[2]	2005	2006	2007	2008	2009
Cement:					
Clinker	NA	NA	NA	NA	NA
Other[e]	280,000	280,000	300,000 [r]	310,000	300,000
Crushed rock	586,607	137,023	937,030	507,591	500,000
Dolomite, crude (excluding calcined, crushed dolomite aggregate)	1,675,882	1,688,643	5,730,865 [r]	2,305,065	929,070
Gravel, pebbles, shingle and flint of a kind used for concrete aggregates; for road metalling or for railway and other ballast	2,817,287	3,824,965	5,759,249	6,011,735	5,192,952
Gypsum	220,000 [e]	230,000	230,000 [r,e]	230,000 [e]	230,000
Limestone	420,000 [e]	NA	NA	NA	NA
Peat	829,865	931,103	820,996	923,404	1,163,803
Sand, construction	3,012,000	1,936,000	3,601,000	2,153,000	1,314,535
Sand and gravel	3,242,199	2,132,779	4,284,684 [r]	2,222,504	2,292,848
Silica sand, industrial	18,300	12,600	13,000 [e]	12,000 [e]	12,000
Steel, crude[e]	550,000	550,000	550,000 [r]	550,000	550,000

[e]Estimated; estimated data are rounded to no more than three significant digits. [r]Revised. NA Not available.

[1]Table includes data available through January 11, 2011.

[2] In addition to the commodities listed, natural gas was also produced, but available information is insufficient to estimate production.

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The Mineral Industry of Lithuania

By Richard M. Levine

Lithuania's main mineral commodity production enterprises were its nitrogen fertilizer enterprise Achema AB in Jonava and its petroleum refinery AB Orlen Lietuva near Mazeikai. The country also produced industrial mineral products, which included cement, clays, and sand and gravel, and mineral fuels, which included peat and crude petroleum. The country's Port of Klaipeda was a transshipment center for mineral products, and crude oil was transported from the Butinge oil terminal to the Orlen Lietuva refinery.

Lithuania had the Baltic States' only nuclear powerplant at Ignalina; the plant was of the Reactor Bolshoi Moschnosti Kanalynyi-2 (RBMK-2) model—the same Soviet-era nuclear reactor model that was involved in the accident at the Chernobyl plant in Ukraine. The Ignalina nuclear powerplant originally consisted of two reactor units, which Lithuania learned that it would be required to close when its application to join the European Union was accepted in 1999. The Government closed unit 1 in December 2004. On December 31, 2009, the Government closed unit 2, which eliminated the country's domestic nuclear power electricity generation capacity. The two reactors had been reliant on nuclear fuel from Russia. The second unit at Ignalina had been supplying more than 70% of Lithuania's electricity (World Nuclear News, 2010).

Lietuvos Energija AB, which was the county's state-owned owned electric utility, indicated that Lithuania was prepared for the plant's closure. According to Lietuvos Energija, the country's demand for electricity in 2010 was expected to be about 9.1 terawatthours, of which more than one-half would be generated by domestic electric powerplants and the remainder would be imported, primarily from Belarus, Estonia, Latvia, Russia, and Ukraine, with which it had signed contracts. Possibilities also were being pursued to import electricity from the Scandinavian counties (World Nuclear News, 2010).

Lithuania wanted to continue using nuclear power and had proposed constructing a new nuclear powerplant at Visaginas near Ignalina, with the participation of Estonia, Latvia, and Poland. The first reactor of the new two-reactor-unit plant could come online in 2018. Each reactor would have a capacity of up to 1,700 megawatts. The project partners in the construction of the new plant, along with Lietuvos Energija, were Eesti Energia AS of Estonia, Latvenergo AS of Latvia, and Polska Grupa Energetyczna S.A. of Poland (World Nuclear News, 2010).

Production

In 2009, Lithuania's gross domestic product (GDP) decreased at an estimated rate of 14.9% compared with that of 2008 in the wake of the global economic downturn (U.S. Central Intelligence Agency, 2011). In 2009, production of nonfuel mineral commodities decreased significantly, reflecting the sharp downturn in the GDP. Production of mineral fuels, however, experienced far less significant decreases and, in the case of peat, production increased. Data on mineral production are in table 1.

Structure of the Mineral Industry

Lithuania had privatized almost all formerly state-owned enterprises, and more than 79% of the economy's output was produced by the private sector. The private sector employed more than 65% of the country's workforce. In 2009, major companies still under state ownership that could be privatized were Lithuanian Railways and Lithuanian Post (U.S. Department of State, 2010). The Ignalina nuclear powerplant was a state-owned enterprise (Ignalina Nuclear Power Plant, 2008).

References Cited

Ignalina Nuclear Power Plant, 2008, Publications—V.Shevaldin manages INPP for 10 years: Ignalina Nuclear Power Plant. (Accessed January 1, 2009, at http://www.iae.lt/inpp_en.asp?lang=1&subsub=38.)

U.S. Central Intelligence Agency, 2011, Lithuania, *in* The world factbook: U.S. Central Intelligence Agency. (Accessed January 17, 2011, at https://www.cia.gov/library/publications/the-world-factbook/geos/lh.html.)

U.S. Department of State, 2010, Lithuania: U.S. Department of State background note, July 2. (Accessed January 17, 2011, at http://www.state.gov/r/pa/ei/bgn/5379.htm.)

World Nuclear News, 2010, Lithuania shuts Ignalina plant: World Nuclear News, January 4. (Accessed January 11, 2011, at http://www.world-nuclear-news.org/NP-Lithuania_shuts_Ignalina_plant-0401104.html.)

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TABLE 1

LITHUANIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	2005	2006	2007	2008	2009
Cement	832,076	1,065,367	1,105,365	1,075,581	583,100
Common clays and shales for construction use	289,465	385,275	384,850	624,470	246,398
Crushed granite	891,000	874,000	846,000	810,000	NA
Crushed stone used for concrete aggregates, for roadstone and for other construction use	4,752,041	5,247,978	6,401,662 r	6,896,987	2,426,773
Dolomite, crude (excluding calcined, crushed dolomite aggregate)	7,196	10,455	2,131	4,752	187
Granules, chippings, and powder of stones, excluding marble	4,316	10,390	21,885	15,538	6,222
Limestone	1,242,200	1,776,300	1,754,000	1,625,089	858,411
Peat:					
Horticultural use	536,000	471,000 r	307,000 r	521,000	542,500
Fuel use	68,000	50,000	15,000	15,000 e	15,000 e
Petroleum:					
Crude	216,634	180,894	154,449	127,658	115,000
Refinery products	8,518,500	7,709,800	5,263,500	8,814,800	8,012,300
Sand and gravel:					
Construction sand	3,689,217	4,342,743	5,085,839 r	5,055,172	2,388,786
Gravel, pebbles, shingle and flint	3,345,185	3,290,568	4,095,713 r	4,414,239	1,551,971
Silica sand, industrial	46,500	42,600	45,400	38,300	41,200
Sulfur	74,277	61,135	42,618	73,870	69,995
Sulfuric acid kilograms	713,200	730,253	747,494	686,629	314,000

eEstimated; estimated data are rounded to no more than three significant digits. rRevised. NA Not available.

[1]Table includes data available through January 17, 2011.

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The Mineral Industry of Macedonia

By Mark Brininstool

Macedonia produced a range of metals, as well as industrial minerals and lignite. Production was not significant on either a world or regional scale, but exports of metal commodities were a relatively important source of revenue for Macedonia. Petroleum was imported and processed at the country's sole domestic refinery (table 1).

Minerals in the National Economy

Macedonia's real gross domestic product (GDP) decreased by 0.5% compared with the GDP in 2008. In 2008 (the latest year for which data were available), manufacturing made up 17.2% of the GDP and mining and quarrying made up only 1.1%. Mineral fuels continued to have a significant effect on Macedonia's trade balance. In 2009, mineral fuels, lubricants, and related materials made up 16.1% of the value of Macedonian imports and 7.5% of the value of exports. Macedonia's State Statistical Office listed ferronickel, flat-rolled steel products, and petroleum products as the country's most significant export items, although data concerning the value of the trade of these goods in 2009 were not available (Republic of Macedonia State Statistical Office, 2010a; b, p. 5; c, p. 29).

Production

Production of a wide range of mineral commodities decreased in 2009 as the effects of the world economic crisis reduced demand for these products. Production of ferrosilicon decreased by about 82%; nickel content of ferronickel, by 12%; and copper content of concentrate, by about 10%. Production of lead metal and zinc metal increased by 53% and 10%, respectively. Production decreased significantly for a number of industrial minerals, including marl, which decreased by 48%; gypsum, by 36%; bentonite, by 33%; feldspar, by 33%; sand and gravel by 23%; limestone flux, by 16%; and silica sand, by 15% (table 1).

Structure of the Mineral Industry

Table 2 is a list of major mineral industry facilities.

Commodity Review

Metals

Copper.—Copper production decreased in large part because the Bucim Mine stopped operations for about 1 month in January and February owing to the low price of copper. Production at the mine had been planned to restart on February 11, and it is assumed that production did restart sometime in February. EurOmax Resources Ltd. of Canada undertook exploration for copper deposits and reported inferred resources of 303 million metric tons (Mt) of ore grading 0.23% copper, 0.31 gram per metric ton gold, and 0.005% molybdenum near Ilovitza in southeastern Macedonia (SeeNews, 2009; EurOmax Resources Ltd., 2010, p. 7).

Mineral Fuels

Lignite.—Four open pit mines operated by AD ELEM produced lignite to supply the thermal powerplants (TPP) at Bitola and Oslomej. AD ELEM planned to extend the life of the Suvodol Mine by exploiting the mine's undercoal series, which AD ELEM estimated to have lignite reserves of 50 Mt. Development of the Brod-Gneotino Mine and the undercoal series at the Suvodol Mine were forecast to extend the available supply of domestic lignite to the Bitola TPP by 20 to 25 years past the expected 2012 end of currently active lignite mining projects. AD ELEM also intended to develop the Zivojna lignite deposit, which is located south of the Suvodol Mine and the Bitola TPP. AD ELEM expected mining at Zivojna to produce about 2.3 million metric tons per year of lignite from about 65 Mt of reserves, but owing to a relatively large amount of overburden and the deposit's distance from the Bitola TPP, the mine was expected to be exploited only after the Suvodol Mine is exhausted (AD ELEM, 2009, p. 9; 2010a, b).

Outlook

World economic conditions are expected to continue to have a strong effect on Macedonia's mineral industry. If the economic situation improves, mineral production could increase provided foreign demand for metals and demand for construction materials increases. The level of lignite production was expected to remain similar to the 2008 output level to maintain electricity production.

References Cited

AD ELEM, 2009, Annual report 2008: AD ELEM, August, 67 p. (Accessed September 11, 2009, at http://www.elem.com.mk/images/photo/interen/Annual Report_2008_ANG.pdf.)

AD ELEM, 2010a, Mine Zivojno: AD ELEM. (Accessed August, 5, 2010, at http://www.elem.com.mk/en/Zivojno.asp.)

AD ELEM, 2010b, SM Sudovol—Under coal series: AD ELEM. (Accessed August 5, 2010, at http://www.elem.com.mk/en/UnderCoalSeries.asp.)

EurOmax Resources Ltd., 2010, Annual report 2009: Vancouver, British Columbia, Canada, EurOmax Resources Ltd., June 1, 48 p.

Republic of Macedonia State Statistical Office, 2010a, Gross domestic product, 2008: Skopje, Macedonia, Republic of Macedonia State Statistical Office, May, 79 p.

Republic of Macedonia State Statistical Office, 2010b, Gross domestic product, first quarter of 2010: Skopje, Macedonia, Republic of Macedonia State Statistical Office, June 25, 79 p.

Republic of Macedonia State Statistical Office, 2010c, The international trade volume of the Republic of Macedonia in the period January-December 2009 decreased by 28.6% in comparison with the international trade volume in the same period in 2008: Skopje, Macedonia, Republic of Macedonia State Statistical Office, February 8, 79 p.

SeeNews, 2009, Macedonian copper mine Bucim to restart operations on February 11—Media: SeeNews, February 2. (Accessed February 20, 2009, at http://www.seenews.com/news/latestnews/macedoniancoopermineBucimtorestartoperationonfebruary11-media-120707).

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TABLE 1
MACEDONIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007	2008	2009
METALS						
Chromite:						
Ore, gross weight	thousand metric tons	--	--	-- r	-- r	--
Concentrate		--	--	-- r	-- r	--
Copper, mine and concentrator output:						
Ore, gross weight	thousand metric tons	2,536	4,132	4,109	4,240	3,767
Concentrate:						
Gross weight		22,854	33,591	33,467	38,337	35,430
Cu content[e]		5,000 r	7,000 r	7,400 r	8,400 r	7,600
Iron and steel:						
Ferroalloys:						
Ferromanganese		-- e	--	--	12,623	--
Ferronickel (24% Ni), gross weight[e]		33,900	45,100	63,800	62,600	50,000
Ferrosilicon		71,249	59,023	34,215	42,674 r	7,657
Silicomanganese		-- e	--	70,472	54,931	--
Total		105,000 r	104,000 r	168,000 r	173,000 r	57,700
Steel:						
Crude, secondary		325,690	360,304	371,930	252,461	276,215
Semimanufactures		319,123	353,964	366,076	252,946	270,397
Lead, mine output, concentrate, Pb content		--	9,000 r	29,000 r	34,000	52,000
Nickel, Ni content of FeNi		8,141	10,942	15,321	15,026	12,000
Zinc, mine output, concentrate, Zn content		--	11,000	24,000 r	29,000 r	32,000
INDUSTRIAL MINERALS						
Cement	thousand metric tons	887 r	924 r	945 r	916 r	909
Clays, bentonite		25,767	32,507	35,234	22,890	15,350
Dolomite:						
Not frayed, not calcined		69,216	119,109	96,723	75,855	78,523
Sintered		14,059	20,054	19,351	23,933	21,607
Agglomerated		--	--	3,337	4,179	3,814
Feldspar, crude		27,076	32,824	32,814	28,920	19,377
Gypsum, crude		190,232	267,760	255,500	242,400	154,550
Lime		15,009	12,704	7,517	--	2,713
Limestone flux		657,863	622,829	848,498	827,100	694,968
Marl		898,397	1,059,872	1,112,870	1,083,830	560,170
Pumice and related materials, volcanic tuff		62,844 r	66,987 r	80,910	103,476	113,064
Sand and gravel, excluding glass sand	cubic meters	87,243 r	42,696 r	30,020 r	39,559 r	30,631
Silica sands (quartz sands or industrial sands)	do.	97,029	113,240	97,432	84,969	72,313
Stone, excluding quartz and quartzite:						
Dimension, crude		54,170 r	65,569 r	60,271 r	71,819 r	69,082
Crushed and broken	cubic meters	125,154	111,829	58,369	33,023	34,436
Talc, crude		1,955	1,025	1,775	977	--
MINERAL FUELS AND RELATED MATERIALS						
Lignite	thousand metric tons	6,949	6,722	6,569	7,746	7,454
Petroleum, refinery products[e, 3]	thousand 42-gallon barrels	7,400	8,200	8,300	8,300	7,700

[e]Estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. do. Ditto. -- Zero.

[1]Table includes data available through August 5, 2010.

[2]In addition to commodities listed, secondary aluminum in small amounts, common clay, diatomite, and gold also are thought to have been produced, but available information is inadequate to make reliable estimates of output.

[3]Figures were converted to barrels from production in thousand metric tons, which was reported as the following: 2005—919; 2006—1,022; 2007—1,042; 2008—1,036; 2009—963.

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TABLE 2
MACEDONIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Cement	Usje Cementarnica AD (Titan S.A., 95%)	Plant at Skopje	1,000 e
Chromite, concentrate	Jugohrom, Hemijsko-Elektrometakurski Kombinat (HEK)	Concentrator at Radusa	NA
Copper ore	Bucim Mine (Solway Investment Group Ltd.)	Mine and mill at Bucim, west of Radovis	4,100
Ferroalloys:			
Ferrosilicon	Silmak DOOEL	Plant at Jegunovce	80
Silicomanganese	Skopski Leguri DOOEL	Plant at Skopje	56
Ferromanganese	do.	do.	66
Ferronickel, Ni content	Feni Industries (Cunico Resources)	Ferronickel plant at Kavadarci	16 e
Gold, mine output	Bucim Mine (Solway Investment Group Ltd.)	Mine and mill at Bucim, west of Radovis	NA
Lead, metal	MHK d.o.o. Zletovo	Imperial smelter at Titov Veles	38
Do.	do.	Refinery at Titov Veles	35
Lead-zinc, concentrate	Sasa Mine (Solway Investment Group Ltd.)	Mill at Sasa, north of Makedonska Kamenica	NA
Lead-zinc ore	do.	Mine at Sasa, north of Makedonska Kamenica	1,000
Do.	Zletovo Mine (Indo Minerals and Metals DOOEL)	Mine and mill near Probistip	500 e
Do.	Toranica Mine (Indo Minerals and Metals DOOEL)	Mine near Dolga Livada	100 e
Lignite	AD ELEM (state owned)	Mine at Suvodol	6,500
Do.	do.	Mine at Oslomej	1,000 e
Do.	do.	Star Rudnik Mine at Oslomej	310 e
Do.	do.	Brod-Gneotino Mine, south of Suvodol near Brod	2,000 e, 1
Nickel, ore	Feni Industries (Cunico Resources)	Opencast mine at Rzanovo, 20 miles south of Kavadarci	NA
Petroleum, refined 42-gallon barrels	OKTA A.D. Skopje (EL.P.ET Balkanike, 81.51%)	Oil refinery at Skopje	20,000 e
Steel, crude, secondary	Makstil A.D. Skopje (Duferco Group, 62%)	Plant at Skopje	360
Zinc, metal	MHK Zletovo	Imperial smelter plant and refinery at Titov Veles	60

eEstimated. Do., do. Ditto. NA Not available.

1The Brod-Gneotino Mine remained under development and did not produce any coal in 2009. AD ELEM expects the mine to have a production capacity of 2,000,000 metric tons per year when development is complete.

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THE MINERAL INDUSTRY OF MALTA

By Harold R. Newman

The Maltese archipelago consists of three inhabited islands—Malta [which has an area of 245 square kilometers (km^2)], Gozo (67 km^2), and Comino (2.8 km^2)—and four other uninhabited islands. It is located about 1,800 kilometers (km) from the Strait of Gibraltar and 1,900 km from Beruit, Lebanon. Malta is situated in a strategic position for traffic sailing through or across the Strait of Sicily and, in 2009, the country continued to be an important transshipment center in the Mediterranean (Odyssey, 2009).

Malta became a European Union (EU) member in 2004 and officially adopted the euro as its official currency in 2008. Malta's economy was negatively affected by the global economic downturn and, in 2009, the Government was challenged to contain the budget deficit, which increased to about 4.1% of the gross domestic product (and placed it above the euro area's 3% maximum) (ReportLinker, 2009).

The mineral-related economy of the country depended mainly on trade and the storage of crude oil in the Malta Freeport. In 2009, Malta's total exports were valued at an estimated $2.5 billion, and total imports were valued at an estimated $3.9 billion. Exports from the United States to Malta in 2009 were valued at $253,438 million, including fuel oil ($60,573 million), engines and turbines for military aircraft ($2,484 million), iron and steel mill products ($247 million), petroleum products ($205 million), and aluminum and alumina ($42 million) (U.S. Census Bureau, 2009a).

Exports from Malta to the United States in 2009 were valued at $278,600 million, including auto parts and accessories ($524 million), materials handling equipment ($101 million), and stone, sand, cement, and lime ($13 million). The EU countries as a group were Malta's principal trading partners (U.S. Census Bureau, 2009b).

Malta Freeport Terminals Ltd. was established to develop the Malta Freeport to offer modern transshipment facilities, storage, and assembling and processing operations, including an oil terminal with bunkering facilities. The transshipment and reexport of goods in 2009 continued to be significant to the country's economy. The Malta Freeport handled more than 2.3 million 20-foot (ft)-equivalent units (TEUs). A TEU is a 20 ft by 8 ft by 8 ft intermodal shipping container. A standard 40-ft (40 ft by 8 ft by 8 ft) container equals two TEUs. The freeport's infrastructure comprised an operational 2-km-long quay, a dredged water depth along all mainline berths of 15.5 meters, and a total area of 615,000 square meters for container storage (Malta Freeport Terminals Ltd., 2009).

Production

Malta has few natural resources and the only exploited mineral resources in 2009 were limestone and solar salt. Quarrying was done mainly by small family-operated businesses, as were the solar salt operations. Malta depended almost completely on imports of raw materials and fuels. All mineral production was for domestic consumption (table 1).

Structure of the Mineral Industry

Numerous stone quarries operated on Gozo and Malta islands. Available information regarding ownership, production, capacity, and location, however, was inadequate to prepare a Structure of the Mineral Industry table for Malta.

Commodity Review

Mineral Fuels

Petroleum.—Mediterranean Oil & Gas plc of the United Kingdom held a 90% interest in Area 4 (Blocks 4, 5, 6, and 7) of southern offshore Malta; Leni Gas & Oil plc (LGO) of the United Kingdom (an international oil and gas exploration, development, and production company) held the remaining 10% interest. The area was governed by a production-sharing contract with the Government and included a commitment to drill by July 2011. Four prospects with estimated recoverable reserves of 1.5 billion barrels had been identified. In 2009, the joint venture undertook various geoscience studies and data acquisition surveys to identify the drill targets and well plan (Leni Gas & Oil plc, 2010).

Outlook

Malta's entrepôt activities in the Mediterranean area are expected to continue, along with offshore exploration for petroleum. Industrial minerals will continue to be produced for domestic consumption.

References Cited

Leni Gas & Oil plc, 2010, Corporate activity & production update—December 2009: Leni Gas & Oil plc. (Accessed February 20, 2010, at http://www.iii.com.uk/investment/detail%3Fcode%3Dcotn:LGO.L&it%3Dle.)

Malta Freeport Terminals Ltd., 2009, A premier transshipment hub: Malta Freeport Terminals Ltd. (Accessed February 4, 2010, at http://www.freeport.com.mt/NewsViewPrint.asp?Newsid=93.)

Odyssey, 2009, Maltese archipelago: Odyssey. (Accessed February 8, 2010, at http://www.odysseyadventures.ca/articles/malta_temples/maltemples_geog.htm.)

ReportLinker, 2009, Malta—Economy statistics and industry reports: ReportLinker. (Accessed February 8, 2010, at http://www.reportlinker.com/r0815/Malta-industry-repoerts.html.)

U.S. Census Bureau, 2009a, U.S. exports to Malta: U.S. Census Bureau. (Accessed February 7, 2010, at http://www.census.gov/foreign-trade/statistics/product/enduse/exports/c4730.html.)

U.S. Census Bureau, 2009b, U.S. imports from Malta: U.S. Census Bureau. (Accessed February 7, 2010, at http://www.census.gov/foreign-trade/statistics/product/enduseimports/c4730.html.)

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TABLE 1

MALTA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Cubic meters)

Commodity[3]	2005	2006	2007	2008	2009
Limestone	1,200,000	1,200,000	1,200,000	1,200,000	1,200,000
Salt	6,000	6,000	6,000	6,000	6,000

[1]Estimated data are rounded to no more than three significant digits.

[2]Table includes data available through April 30, 2010.

[3]In addition to commodities listed, small amounts of cement, fertilizer, lime, and plaster are produced, but available information is inadequate to make reliable estimates of output.

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The Mineral Industry of Moldova

By Richard M. Levine

Moldova had a small mineral industry that was primarily engaged in the mining and production of industrial minerals and mineral products, including cement, clays, dimension stone, gypsum, limestone, industrial sand, and sand and gravel. Moldova was dependent on imports for all its coal, natural gas, and oil supplies, which came mainly from Russia (U.S. Central Intelligence Agency, 2009).

Moldova had a steel minimill (the Moldova Steel Works), which had the capacity to produce more than 1 million metric tons per year of crude steel and 960,000 metric tons per year of rolled-steel products. The steel mill was located in Ribnita in the region of Transnistria, which is a territory within the internationally recognized boundaries of the Republic of Moldova. Transnistria declared its independence as a separate republic of the Union of Soviet Socialist Republics on September 2, 1990. Although the separatist Transdniester Moldovan Republic (also known as Pridnestrovian Moldavian Republic) continued to exercise effective control over most of Transnistria, its independence had not been recognized by the Government of Moldova or internationally.

The country's main mineral resources were of industrial minerals to produce construction materials and for use in the cement, chemical, food processing, and glass industries. Small deposits of iron ore, natural gas, and oil had been explored but were not economic to develop. According to assessments as of January 1, 2007 (the latest year for which data were available), reserves of industrial minerals had been determined for 17 types of industrial minerals in 423 deposits, of which 176 deposits were being mined and 56 deposits were prepared for development but were being kept in reserve by the Government until conditions were deemed suitable for their development. Argillaceous and carbonate rocks were extracted for cement production, and gypsum and pyrite cinders were used as additives in cement production. Raw materials for cement production were based in two clay and two limestone deposits, which had adequate reserves to provide these raw materials for cement production for 50 years at the 2006 level of output (Zhalalite and others, 2007).

Production

In 2009, the gross domestic product reportedly decreased by 7.9% and the value of industrial production decreased by 22.2% compared with that of 2008 (Interfax Russia & CIS Statistics Weekly, 2010). In 2009, the volume of output in the mineral extraction sector decreased by 32.1% compared with that of 2008 (National Bureau of Statistics of the Republic of Moldova, 2010). Output in the steel industry was valued at $195.2 million, which was 58.3% less than in 2008 (Infotag, 2010). Data on mineral production are in table 1.

Structure of the Mineral Industry

Practically all mineral production enterprises were stock companies that had the participation of foreign enterprises (Zhalalite and others, 2007). Table 2 is a list of major mineral industry facilities.

Commodity Review

Metals

Iron and Steel.—In 2009, steel production was Transnistria's second ranked industry following electric power generation, and steel was one of Transnistria's major exports. The Moldovan Metallurgical Plant, which accounted for 70% of the value of the Transnistria region's exports, reported that in 2009 steel production decreased by 51.9% to 425,900 metric tons (Imedia, 2010).

Industrial Minerals

Gypsum.—In the northern part of Moldova, two gypsum deposits had been explored, of which one, the Kirovskoye, had been mined since 1958 while the other was being held in reserve. Explored gypsum reserves in the Kirovskoye deposit as of January 1, 2007, reportedly were 16 million metric tons (Mt); 25 Mt of explored gypsum reserves was in other deposits being held in reserve. Gypsum was produced by the German-Moldovan CMC-Knauf AG joint venture, and a portion of the gypsum production was exported (Zhalalite and others, 2007).

Outlook

The mineral industry of Moldova is expected to continue to be centered on the production of industrial minerals and steel. The country has very limited resources of hydrocarbons and iron ore, and its only significant mineral resources are of industrial minerals used in the cement, chemical, construction materials, food processing, and glass industries. For Moldova to increase production of industrial minerals significantly, it would likely have to increase its investment in exploration significantly, which would probably require establishing additional cooperative projects with foreign partners (Zhalalite and others, 2007).

References Cited

Imedia, 2010, Steel production—70 percent of Transnistrian exports—Plummets because of crisis: Imedia Press Group, January 26. (Accessed May 27, 2010, at http://www.imediaenglish.blogspot.com/2010/01/steel-production-70-percent-of.html.)

Infotag, 2010, Transnistria's industrial output declines: Infotag News Agency, January 26. (Accessed May 27, 2010, at http://www.infotag.md/news-en/581923/.)

Interfax Russia & CIS Statistics Weekly, 2010, Key socioeconomic indexes for CIS countries in 2009: Interfax Russia & CIS Statistical Report, January 30–February 12, p. 4.

National Bureau of Statistics of the Republic of Moldova, 2010, Volume indices of industrial production—Monthly, by types of activity (corresponding period of the previous year = 100) (2004-2010): National Bureau of Statistics of the Republic of Moldova. (Accessed May 27, 2010, at http://www.statistica.md/category.php?l=en&idc=127&.)

Digitized by Google

U.S. Central Intelligence Agency, 2009, Moldova, *in* The world factbook: U.S. Central Intelligence Agency. (Accessed January 5, 2010, at https://www.cia.gov/library/publications/the-world-factbook/geos/md.html.)

Zhalalite, R.P., Il'inskiy, Yu. F., and Bilyk, A.N., 2007, Sostoyaniye mienral'no-syr'yevoy bazy Respubliki Moldova [The condition of the mineral-raw material base of the Moldovan Republic]: Gornyy Zhurnal [Mining Journal], no. 10, p. 43-46.

TABLE 1
MOLDOVA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008[e]	2009[e]
METALS						
Crude steel		1,016,000	675,400	995,000	885,000	425,000 [2]
INDUSTRIAL MINERALS						
Cement		641,000	837,000	800,000 [e]	750,000	700,000
Clays, unspecified		--	227,968	165,040	165,000	150,000
Gypsum		130,800	186,200	311,900	300,000	250,000
Lime		1,900	2,153	1,135	1,000	800
Limestone		--	15,333	166,870	165,000	150,000
Sand and gravel[e]		1,900,000	289,042 [2]	272,197 [2]	200,000	150,000
MINERAL FUELS AND RELATED MATERIALS						
Natural gas, dry	million cubic meters	NA	56	--	50	50
Peat, fuel use[e]		475,000	475,000	475,000	475,000	475,000

[e]Estimated; estimated data are rounded to no more than three significant digits. -- Zero.
[1]Table includes data available through May 31, 2010.
[2]Reported figure.

TABLE 2
MOLDOVA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location or deposit names	Annual capacity[e]
Cement		Lafarge Ciment (Moldova) S.A. (Lafarge S.A., 95.31%)	Rezina	1,100,000
Granite	thousand cubic meters	NA	Cosauti	150
Gypsum		Chisinau Municipal Council (CMC)-Knauf AG (joint Moldovan-German venture)	Kirovskoye deposit	850,000
Oil and natural gas:				
Oil		Redeco Moldova Oil and Gas Co. [Resource Development Company, Ltd. (REDECO), 50%, and Costilla Energy, Inc., 50%]	Valeni oilfield	100,000
Natural gas	thousand cubic meters	do.	Victorovca gasfield	5,000
Sand and gravel	do.	NA	71 mined deposits	1,000
Steel, crude		OJSC Moldova Steel Works [Rumney Trust Reg, 75%; Energy Investment and Management Corp. (EIM), 15.6%; Government, 9.4%]	Ribnita, Transnistria region	1,100,000

[e]Estimated; estimated data are rounded to no more than three significant digits. do. Ditto. NA Not available.

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THE MINERAL INDUSTRY OF MONTENEGRO

By Mark Brininstool

Montenegro's mineral industry included the mining and processing of bauxite, industrial minerals, and lignite. Metal production included alumina refining, primary aluminum smelting, and steel output (table 1). In 2009, Montenegro's real gross domestic product (GDP) decreased by 7% compared with that of 2008. In 2008 (the latest year for which data were available), manufacturing made up 5.4% of the GDP and mining and quarrying made up only 1.2% (Statistical Office of the Republic of Montenegro, 2009, p. 72; International Monetary Fund, 2010, p. 159).

Production

In 2009, Montenegro saw significant declines in the production of all its mineral commodities. Compared with that of 2008, production of bauxite decreased by 93%; crude steel, by an estimated 75%; alumina, by 73%; gravel and lime, each by 49%; lignite, by 45%; aluminum, by 41%; and salt, by 33% (table 1).

Structure of the Mineral Industry

Table 2 is a list of major mineral industry facilities.

Commodity Review

Metals

Aluminum and Bauxite and Alumina.—Production of alumina and aluminum decreased as Montenegro's only alumina and aluminum plant, Kombinat Aluminijuma Podgorica (KAP), faced financial losses owing to high production costs and reduced demand and prices for aluminum as a result of the world financial crisis. Montenegro's production capacity of 120,000 metric tons (t) was not significant with respect to world production, but KAP was very important for the economy of Montenegro. The En+ Group of Russia [which owned KAP's majority shareholder, Central European Aluminum Co. (CEAC)] reported that KAP and the Niksic Bauxite Mines (which were also controlled by CEAC) accounted for about 15% of Montenegro's GDP and more than 50% of its exports (En+ Group, 2009).

On November 17, the Government of Montenegro and En+ Group signed an agreement in which the Government granted assistance to KAP in return for one-half of the shares controlled by CEAC. The agreement included sovereign guarantees of up to $188 million[1] for KAP's existing and future debt, a reduction in En+ Group's investment obligations in KAP to be made during the next 5 years (to $54 million from $174 million), and the linking of electricity prices to the price of aluminum on the London Metal Exchange through 2012. The electricity price-structuring agreement was to apply to KAP's electricity tariffs incurred since January 1, 2009. In exchange for these concessions, the Government received one-half of CEAC's shares in KAP, which made the Government and CEAC the two leading shareholders in the company with 29.365% of shares each. The Government also agreed that CEAC could release up to 2,300 of the 3,900 workers at KAP and the Niksic Bauxite Mine (En+ Group, 2009; Kommersant, 2009).

Iron and Steel.—Crude steel production was estimated to have decreased by 75% to 50,000 t. Zeljezara Niksic A.D. announced in April that it would stop production and cited a lack of raw materials as the reason for the shutdown, although most likely the difficult market conditions created by the world financial crisis were a primary reason for the reduction of steel production (B92, 2009).

Mineral Fuels

Coal.—Coal production in Montenegro was not significant by world standards but was an important fuel source for domestic electricity production. Rudnik Uglja A.D. Pljevlja's mine at Pljevlja produced all the country's coal and supplied the Pljevlja thermal powerplant (TPP Pljevlja). In 2008 (the latest year for which data were available), TPP Pljevlja produced 43% of the electricity produced in Montenegro and about 25% of the total amount of electricity consumed. TPP Pljevlja, Montenegro's two large hydroelectric powerplants, and other small hydroelectric powerplants produced about 60% of the electricity consumed in Montenegro (Elektroprivreda Crne Gore A.D. Niksic, 2009, p. 21-22).

Outlook

Montenegro's mineral production is expected to remain modest. Because of KAP's dominant presence in the mineral industry of Montenegro, the success or failure of the Government assistance program will largely determine the overall picture of the industry's financial health.

References Cited

B92, 2009, Montenegro—Steel plant sends workers home: B92, April 5. (Accessed June 11, 2009, at http://www.b92.net/eng/news/region-article.php?yyyy=2009&mm=04&dd=05&nav_id=58314.)

Elektroprivreda Crne Gore A.D. Niksic, 2009, Report on business operations of Elektroprivreda Crne Gore A.D. Niksic for year 2008: Niksic, Montenegro, Elektroprivreda Crne Gore A.D. Niksic, May, 59 p. (Accessed September 17, 2009, at http://www.epcg.co.me/pdf/en01_07/ANNUAL REPORT FOR 2008 ENG.pdf.)

En+ Group, 2009, En+ Group and Government of Montenegro agree on future of KAP: En+ Group press release, November 17. (Accessed May 24, 2010, at http://www.enplus.ru/en/press/press/200911/kap_success/.)

International Monetary Fund, 2010, World economic outlook: Washington, DC, International Monetary Fund, April, 195 p.

[1]Where necessary, values have been converted from European Union euros (€) to U.S. dollars (US$) at the rate of €0.72=US$1.00.

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Kommersant, 2009, Oleg Deripaska podelilsya s Chernogoriye kombinatom [Oleg Deripaska shares a plant with Montenegro]: Kommersant, November 18. (Accessed May 21, 2010, at http://www.kommersant.ru/doc-rss.aspx?DocsID=1276468.)

Statistical Office of the Republic of Montenegro, 2009, Statistical yearbook 2009: Podgorica, Montenegro, Statistical Office of the Republic of Montenegro, 354 p.

TABLE 1
MONTENEGRO: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007	2008	2009
METALS						
Alumina		235,196	236,740	240,186	220,426	58,528
Aluminum, metal, ingot, primary		116,995	121,762	124,060	107,457	63,960
Bauxite		672,345	659,370	667,053	671,811	45,779
Iron and steel, crude steel		103,567	163,165	173,849	201,670 r	50,000 e
INDUSTRIAL MINERALS						
Gravel	cubic meters	47,948	82,933	92,914	146,381	74,368
Lime		6,008	8,118	7,089	9,839	4,997
Salt (sea water evaporate)		15,000	5,000	20,000	25,200	17,000
Stone, excluding quartz and quartzite, dimension, crude:						
Ornamental (marble blocks)	cubic meters	21,404	43,057	51,186	50,084 r	30,000 e
Crushed and broken, n.e.s.[3]	do.	92,506	98,360	161,970	179,521 r	120,000 e
Other, stone products	do.	26,149	54,191	60,165	109,436 r	51,373
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Brown		9,000	10,000	7,000	--	--
Lignite		1,288,016	1,502,334	1,195,515	1,740,076	957,164

eEstimated; estimated data are rounded to no more than three significant digits. rRevised. do. Ditto. -- Zero.
[1]Table includes data available through June 4, 2010.
[2]In addition to commodities listed, common clay and diatomite also are believed to have been produced, but available information is inadequate to make reliable estimates of output.
[3]Not elsewhere specified.

TABLE 2
MONTENEGRO: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Alumina	Kombinat Aluminijuma Podgorica (KAP) (Central European Aluminum Co., 29.365%, and Government of Montenegro, 29.365%)	Podgorica	280
Aluminum, primary	do.	do.	120
Bauxite	Niksic Bauxite Mines (Central European Aluminum Co.)	Kutsko Brdo	700
Coal	Rudnik Uglja A.D. Pljevlja	Pljevlja	2,000
Steel, crude	Zeljezara Niksic A.D. [MN Specialty Steels Ltd. (MNSS B.V.), 90%]	Niksic	380

do. Ditto.

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The Mineral Industry of the Netherlands

By Alberto Alexander Perez

In 2009, the Netherlands continued to be an important regional producer of natural gas and petroleum for the European market and played a major role as a transshipment center for mineral products that entered and left continental Europe. The Netherlands was a modest producer of metallic and nonmetallic minerals and mineral products; the main emphasis of the Dutch mineral industry was on trade and processing. The world economic slowdown in 2008 affected the Netherlands in terms of its commodity production and its trade, as the traffic through its ports, in particular the Port of Rotterdam, decreased significantly. The most notable decreases in throughput were those of crude petroleum and ores and scrap. The Dutch economy had a strong international focus, as the Netherlands was one of the European Union's (EU's) leading centers of trade and industry. The Port of Rotterdam was the busiest port in Europe in terms of the value and the volume of the cargo handled at the port. Owing largely to its favorable location by the North Sea, the country played a key role as a main port and distribution center for companies operating worldwide. The Netherlands was the EU's third ranked exporting country after Germany and France although it ranked only seventh among EU countries in terms of real GDP based on purchasing power parity (Port of Rotterdam Authority, 2010, p. 2-4).

Minerals in the National Economy

The Staatstoezicht op de Mijnen (SodM) [State Supervision of Mines] is the agency within the Ministerie van Economische Zaken [Ministry of Economic Affairs] that oversees the production of minerals in the Netherlands and the Netherlands Continental Shelf. The agency is responsible for overseeing and enforcing mining, safety, and production regulations.

The mineral sector was dominated by natural gas and petroleum production, of which about 40% was from offshore. Mining was confined to the extraction of limestone, peat, and sand and gravel by quarrying and solution mining of salt in the eastern and northern areas of the country. The Netherlands' principal activity in the nonfuel mineral sector was downstream activities, including the chemical and metallurgical industries, which used mainly imported ores and industrial minerals (table 1; Staatstoezicht op de Mijnen, 2009).

Production

In 2009, production of the Netherlands' principal mineral industry products decreased, including crude steel production, which decreased by 24.4%, crude petroleum (24%), pig iron (23.3%), cadmium (7%), and natural gas (3.5%). The principal mineral commodities that were produced in the Netherlands were primary aluminum, cadmium, cement, crude petroleum, natural gas, iron and steel, and refined zinc. Rotterdam remained extremely important as a shipping and storage center. In 2009, the throughput (import and export) of the following minerals were the most important in terms of total volume: crude petroleum, 96.4 million metric tons (Mt); mineral oil products 72.2 Mt; coal 24.8 Mt; and ores and scrap 23.3 Mt (table 1; Port of Rotterdam Authority, 2010).

Structure of the Mineral Industry

Mineral industry facilities were mostly privately owned, although the Government continued to be involved in the energy sector through the regulation and oversight of petroleum and natural gas operations. Table 2 is a list of the major mineral industry facilities in the Netherlands.

Commodity Review

Metals

Aluminum.—In January, a subsidiary of Tata Steel International, the Corus Group Ltd. (which was headquartered in both the Netherlands and the United Kingdom), and Klesch and Co. Ltd. of the United Kingdom signed a share purchase agreement for the acquisition of Corus' aluminum smelter in the Netherlands by an affiliate of Klesch called Briand Investments B.V. (Tata Steel International, 2009b).

Iron and Steel.—Corus began testing a new ironmaking technology called "Hisarna" in a pilot plant project at its Ijmuiden steelworks. The technology has the potential to reduce emissions of carbon dioxide in blast furnace steelmaking by more than 50%. The project, which was expected to cost $26 million (20 million euros), was an initiative of ULCOS (Ultra-Low CO_2 Steelmaking), which was a consortium of European steelmakers that was developing new technologies and programs to reduce the steel industry's carbon footprint. The pilot plant was expected to be commissioned at the end of 2010 (Tata Steel International, 2009a).

Mineral Fuels and Other Sources of Energy

Natural Gas.—Northern Petroleum Plc. and its partners started gas production from the Grolloo gasfield. This was the first of four gasfields and two oilfields that were planned to be developed by Northern Petroleum onshore the Netherlands. The Grolloo facilities were commissioned and gas sales commenced in December. The estimated daily rate of gas sales was estimated to be 200,000 cubic meters per day.

The development of all four gasfields (Brakel, Geesbrug, Grolloo, and Wijk en Aalburg) was planned to be completed by 2010. Together, the fields were projected to produce up to 800,000 cubic meters per day.

Petroleum.—In 2009, it was reported that the Port of Rotterdam had expanded its anchorage area to accommodate the increasing demand from oil traders to store fuel at sea. Dutch Waterways Authority Rijkswaterstaat designated a

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15-kilometer area situated northwest of the North Sea resort of Scheveningen as a new anchoring zone. The new area lies along the shipping route to Scandinavia and the Baltic countries (Portworld, 2009).

Renewable Energy.—The Dutch Government continued with its plan to invest about $10 billion in energy supply between 2008 and 2011. Priority was to be given to renewable energy, energy savings, and carbon dioxide reduction to reduce the country's dependence on gas and petroleum (Alexander Gas & Oil Connections, 2008).

Outlook

Renewable energy and natural gas are expected to continue to be the leading sectors to attract investment in the Dutch economy. The Netherlands is heavily investing in the natural gas distribution sector and is poised to become the leading natural gas distribution center in Europe. Mineral processing will continue to be a factor for the development of the mineral industry only as so far as there is an economic recovery in the area that can reactivate demand for such commodities as aluminum, cement, and steel. The Port of Rotterdam continues to be a leading European port, particularly in terms of container traffic, and to play a very important role in the European import and export market. Almost as much cargo is expected to pass through Rotterdam as that of the numbers two, three, and four ports in Europe—Antwerp, Hamburg, and Marseille—combined. The trend towards increased use of the port for cargo handling is expected to continue. A significant percentage of the cargo coming into the port will be processed at the port. The Netherlands is expected to continue to be an exporter of natural gas in the region.

References Cited

Alexander's Gas & Oil Connections, 2008, The Netherlands is set to become power exporter in 2009: Alexander's Gas and Oil Connections. (Accessed October 10, 2008, at http://www.gasandoil.com/goc/company/cne84124.htm.)

Port of Rotterdam Authority, 2010, Port statistics: Port of Rotterdam Authority, 16 p. (Accessed September 1, 2010, at http://www.portofrotterdam.com/en/Port/port-statistics/Documents/Port_Statistics_2009_tcm26-64785.pdf.)

Portworld, 2009, Rotterdam port expands for oil storing and idling ships: Portworld, November 27. (Accessed September 4, 2010, at http://www.portworld.com/news/i90035/Rotterdam_port_expands_for_oil_storing_and_idling_ships.)

Staatstoezicht op de Mijnen, 2009, Mission, vision and strategy: The Hague, Netherlands, Staatstoezicht op de Mijnen. (Accessed December 21, 2009, at http://www.sodm.nl/English/Organisation/Mission_vision_and_strategy.)

Tata Steel International, 2009a, Corus pilot plant could dramatically reduce steel industry emissions: Tata Steel International, November 27. (Accessed September 2, 2010, at http://www.tatasteeleurope.com/en/news/news/2009/2009_pilot_plant_could_reduce_emissions.)

Tata Steel International, 2009b, Corus signs share purchase agreement with Klesch for sale of aluminium smelters: Tata Steel International, January 21. (Accessed September 2, 2010, at http://www.tatasteeleurope.com/en/news/news/2009/2009_sale_aluminium_smelters.)

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TABLE 1

NETHERLANDS: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007	2008	2009[e]
METALS						
Aluminum, metal:						
Primary		340,700	312,300	297,000 [r]	317,000 [r]	317,000
Secondary[e]		50,000	25,000	--	--	--
Cadmium, metal, primary		494	524	495	527 [r]	490 [3]
Iron and steel:						
Pig iron, including blast-furnace ferroalloys (if any)		6,031,000	5,417,000	6,400,000	6,000,000	4,600,000 [3]
Steel:						
Crude		6,919,000	6,372,000	7,368,000	6,880,000	5,200,000 [3]
Semimanufactures		6,134,000	6,394,000	6,800,000 [e]	6,800,000 [e]	5,100,000 [3]
Lead, metal, refined, secondary[e]		17,000	17,000	16,000	16,000	--
Zinc, metal, primary		231,800	235,913	231,652	239,500	224,000
INDUSTRIAL MINERALS						
Cement, hydraulic[e]	thousand metric tons	2,400	2,400	2,400	2,700	2,700
Magnesium compounds:[e]						
Chloride		25,000	25,000	25,000	25,000	25,000
Oxide		10,000	10,000	10,000	10,000	10,000
Nitrogen, N content of ammonia[e]	thousand metric tons	1,700	1,800	1,800	1,800	1,800
Salt, all types	do.	6,155	6,056	6,000 [e]	6,000 [e]	6,000
Sodium compounds, n.e.s.:[e, 4]						
Carbonate, synthetic		350,000	350,000	350,000	350,000	350,000
Sulfate:						
Natural		20,000	20,000	20,000	20,000	20,000
Synthetic		15,000	15,000	15,000	15,000	15,000
Sulfur, elemental byproduct:						
Of metallurgy		141,000	111,000	115,000	115,000	115,000
Of petroleum and natural gas		400,000	400,000	400,000	400,000	400,000
Total		541,000	511,000	515,000	515,000	515,000
MINERAL FUELS AND RELATED MATERIALS						
Gas, dry natural:						
Gross	million cubic meters	83,498	84,000	76,440	76,342	73,700 [3]
Marketed	do.	74,460	73,300 [e]	68,166	68,000	68,000
Petroleum:						
Crude	thousand 42-gallon barrels	11,858	11,426	11,250	12,231 [r]	9,300 [3]
Refinery products:						
Liquefied petroleum gas	do.	53,118	47,202 [r]	38,211 [r]	38,107 [r]	38,100
Gasoline, motor	do.	120,278	116,559 [r]	116,620 [r]	90,470 [r]	90,400
Naphtha and white spirit[e]	do.	90,000	90,000	90,000	90,000	90,000
Kerosene and jet fuel	do.	58,772	57,375 [r]	56,105 [r]	51,936 [r]	51,900
Refinery fuel and loss[e]	do.	30,000	30,000	30,000	30,000	30,000
Diesel oil	do.	157,563	146,863 [r]	145,500 [r]	152,617 [3]	152,000
Residual fuel oil	do.	79,771	78,375 [r]	77,232 [r]	71,562 [r]	71,500
Unspecified	do.	211,993	202,094 [r]	145,379 [r]	131,096 [r]	131,000
Total	do.	801,495	768,468 [r]	699,047 [r]	655,788 [r]	655,000

[e]Estimated; data are rounded to no more than three significant digits; may not add to total shown. [r]Revised. do. Ditto. -- Zero.

[1]Table includes data available through December 31, 2010.

[2]In addition to the commodities listed, the Netherlands produced limestone, peat, and construction materials, such as sand and gravel, but output was not reported and information was not available to make reliable estimates of output.

[3]Reported figure.

[4]Not elsewhere specified.

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TABLE 2
NETHERLANDS: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum:				
Billets		Zeeland Aluminium Co. NV (Klesch and Co. Ltd., 100%)	Plant at Flushing (Vlissingen)	213
Primary		do.	do.	230
Do.		Klesch and Co. Ltd.	Smelter at Delfzijl	100
Secondary		Alumax Recycling BV	Smelter at Kerkade	50
Cadmium	metric tons	Nyrstar Budel B.V. (Zinifex Ltd. and Umicore NV)[1]	Plant at Budel-Dorplein	650
Calcium carbonate, ground		Omya Netherlands BV	Plant at Moerdijk	500
Cement		Eerste Nederlandse Cement Industrie NV (HeidelbergCement Group, 100%)	Plants at IJmuiden, Maastrict, and Rotterdam	3,700
Do.		Cementfabriek IJmuiden BV	Three plants at IJmuiden	1,600
Do.		Cementfabriek Rozenburg BV	Two plants at Rozenburg	920
Limestone		Ankerpoort NV (Lhoist SA, 100%)	Mines at Maastricht and Winterswijk	600
Magnesia		Nedmag Industries Mining & Manufacturing BV	Plant at Veendam	130
Do.		MAF Magnesite BV	Plant at Schiedam	40
Natural gas	million cubic meters	Nederlandse Aardolie Maatschappij BV (NAM) (Exxon Mobil Corp., 50%, and Royal Dutch Shell plc, 50%)	Groningen, Leeuwarden, Assen, and other onshore gasfields and several offshore wells in the North Sea	225
Petroleum:				
Crude	42-gallon barrels per day	BP p.l.c., ConocoPhillips Co., and Chevron Corp.	766 wells (204 producing), including North Sea fields: Haven, Helder, Helm, Hoorn, Kotter, Logger, and Rijn	83,500
Do.	do.	Nederlandse Aardolie Maatschappij BV (NAM) (Exxon Mobil Corp., 50%, and Royal Dutch Shell plc, 50%)	Onshore fields: Berkel, DeLier, Ijselmonde, Meerkapelle, Pernis, Pinacke, Rotterdam, Schoonebeck, West, Werkendam, and Zoetemeer	20,500
Do.	do.	Veba Oil and Gas Netherlands BV	Hanze field, North Sea	31,500
Refineries		Six companies, of which the major ones are:	Refineries, of which:	1,230,500
		Netherlands Refining Co. (BP p.l.c., 69%, and Chevron Corp., 31%)	Rotterdam	(446,000)
		Shell Nederland Raffinaderij BV	Pernis	(374,000)
		Esso Nederland BV	Rotterdam	(175,000)
		Total Raffinaderij Nederland NV	Vlissingen	(150,000)
Salt		Akzo Nobel Salt BV (Akzo Nobel NV, 100%)	Mines, of which:	4,100
		do.	Hengelo	(2,100)
		do.	Delfzijl	(2,000)
Sand, silica		Sigrano Nederland NV (Sibelco Group)	Mines and plants at Heerlin and Maastricht	500
Do.		Lieben Minërals BV	Mines at South Limburg	150
Sodium:				
Carbonate, synthetic		Brunner Mond Group B.V.	Plant at Delfzijl	380
Sulfate, synthetic		do.	do.	600
Steel		Corus Group Ltd.	Plant at IJmuiden	7,000
Zinc		Nyrstar Budel B.V. (Zinifex Ltd. and Umicore N.V.)[1]	Plant at Budel-Dorplein	260

Do., do. Ditto.

[1] Nyrstar N.V. is an independent publicly traded company formed from the combined zinc and lead smelting and alloying business of Zinifex Ltd. and the zinc smelting and alloying business of Umicore NV.

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The Mineral Industry of Norway

By Harold R. Newman

Norway's diverse geologic terranes offer a broad spectrum of mineral resources for exploration and development. In terms of the value of exports, petroleum was Norway's most important mineral commodity. The growth of the country's natural gas and petroleum sector in the past has contributed significantly to Norway's economy. The mining and quarrying industry, which was mostly a regional industry, was located mainly along the coast.

Minerals in the National Economy

Norway's mineral resources include coal, iron ore, natural gas, nickel, olivine, petroleum, and titanium. The petroleum sector provided about one-half of the country's exports and more than 30% of Government revenue. Norway opted to stay out of the European Union (EU) through a referendum held in November 1994; nonetheless, as a member of the European Economic Area, it contributed sizably to the EU's budget. In anticipation of eventual decreases in natural gas and petroleum production, the Government continued to save a significant amount of revenue from petroleum exports in a sovereign wealth fund (Dimireva, 2010).

Trade was important to the national economy. Norway was the world's 28th ranked exporter. U.S. exports to Norway included other nonferrous metals, $251 million; oilfield and drilling equipment, $207 million; metallurgical-grade coal, $6 million; and specialized mining equipment, $5 million. Norway's exports to the United States included crude petroleum, $888 million; other petroleum products, $970 million; fuel oil, $339 million; and nickel, $182 million (U.S. Census Bureau, 2009a, b).

Ministers from the member states of the European Free Trade Association (EFTA), which included Iceland, Liechtenstein, Norway, and Switzerland, and the Cooperation Council for the Arab States of the Gulf (GCC), which included Bahrain, Kuwait, Oman, Qatar, and Saudi Arabia, signed a free trade agreement in June 2009. The agreement covered a broad range of topics, including trade in goods and services, and Government procurement. The EFTA and the GCC also signed an additional agreement concerning agricultural products. Total merchandise trade between the EFTA and the GCC amounted to $7.2 billion in 2008, which was the latest year for which trade data were available. Trade had grown consistently, recording an average growth rate of 25% between 2003 and 2008. The EFTA was the GCC's sixth ranked export destination in 2008 (European Free Trade Association, 2009).

Production

Norway produced aluminum, cadmium, cobalt, copper, ferroalloys, nickel, steel, and zinc metals and was a global supplier of aluminum, ferroalloys, and petroleum. Metal production of primary aluminum, cobalt, and ferrosilicon decreased. Mine production of various mineral commodities included feldspar, graphite, ilmenite, and iron ore. Aggregates, limestone, nepheline syenite, olivine, and sand and gravel were some of Norway's more economically important industrial mineral raw materials. Industrial mineral production of graphite increased whereas production of ilmenite, limestone, and olivine sand decreased (table 1).

Norway's North Cape Minerals A/S was a leading producer of olivine. The country's production of titanium accounted for about 7% of world production (Gambogi, 2010).

Structure of the Mineral Industry

The Norwegian mineral industry was composed of a mixture of Government and privately owned operations. Table 2 lists the major mineral companies that were operating in Norway in 2009 and their respective mine and (or) plant locations and capacities.

Commodity Review

Metals

Aluminum.—At yearend 2008, Alcoa Inc. of the United States and Orkla ASA of Sweden announced that they had concluded an agreement on the exchange of their equity stakes in a Norwegian smelting partnership and Swedish extrusion profile (SAPA) joint venture. Alcoa would take over Orkla's 50% equity in Elkem Aluminum ANS, which would give Alcoa a 100% share in Elkem Aluminum. The two smelters and anode facilities (Lista, which is located in southern Norway, and Mosjoen, which is located in northern Norway) had a combined output of 282,000 metric tons per year (t/yr) of primary aluminum. The addition of these assets increased Alcoa's global smelting capacity to more than 4.8 million metric tons per year (Mt/yr), making Alcoa a significant primary aluminum producer. Orkla would receive Alcoa's 45% interest in the SAPA extrusion profile business. The two parties would continue to develop and hold joint ownership in the carbothermic process technology that Alcoa was developing together with Orkla. Still in the research and development phase, the carbothermic process is a new technology that holds the potential to produce aluminum at a lower cost because it has reduced conversion costs, lower energy requirements, lower emissions, and a lower capital cost than traditional smelting (Alcoa Inc., 2008).

Hydro Aluminium ANS (a subsidiary of Norse Hydro ASA) announced that it would close the Soderberg potlines at the Karmoy aluminum plant. Soderberg, which employed some of the oldest electrolytic technology, produced 120,000 t/yr aluminum. The potlines had to be closed by yearend owing to the more stringent emission limits imposed by the Norwegian Pollution Control Authority (Reuters, 2009).

Cobalt.—The toll refining of cobalt concentrate (which was produced by BHP Billiton) at Xstrata plc of Switzerland's

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Nikkelverk A/S refinery at Kristiansand was expected to cease by yearend 2009. The Nikkelverk refinery had the capacity to process 86,000 t/yr of nickel, 39,000 t/yr of copper, and 5,000 t/yr of cobalt (Metal Bulletin, 2009, p. 4).

Iron and Steel.—Northern Iron Ltd. is an Australian company formed to acquire the Sydvaranger iron ore project, which consisted of the Bjornevatin, the Fisketinind Ost, the Hyttemalmen, and the Kjelimannsasen projects. Northern Iron reported that mining was continuing at its Hyttemalmen open pit mine and that 400,000 metric tons (t) of ore had been mined by the end of September 2009. Construction of the processing plant was essentially complete, and commissioning of the mill area was underway at yearend 2009 (Metals Economics Group, 2009).

Nickel.—The Nikkelverk refinery processed primary nickel, and associated cobalt, copper, and precious metals were recovered as byproducts. Nikkelverk used a chlorine leach and electrowinning process to separate and recover component metals, which is a cost-effective means of treating complex raw materials. The efficiency of the process allows greater flexibility in sourcing and treating custom feed. The plant ranked among the lowest-cost nickel refineries in the Western World. The refinery processed a granulated matte produced by Xstrata's Raglan and Sudbury operations in Canada, as well as custom feed from other sources (Xstrata plc, 2009).

Titanium.—Titania A/S was one of the world's leading producers of ilmenite, accounting for about 6% of world production. It was the leading producer of ilmenite in Europe. Production from the Tellnes open pit mine resulted in about 671,000 t of ilmenite concentrate containing 43% titanium dioxide (Norges geologiske undersøkelse, 2010, p. 21).

Industrial Minerals

Norway was a significant producer of industrial minerals from more than 30 mines. It was among the world's leading producers of olivine and nepheline syenite. Production of aggregate, gravel, and sand were some of Norway's important raw materials. Industrial minerals represented a market worth about $1.1 billion (Norges geologiske undersøkelse, 2010, p. 15, 36).

North Cape Minerals A/S, which produced olivine, announced that it was suspending its operations at Bryggja and Raubergvik but leaving the Åheim Mine and plant open. North Cape Minerals stated that the reduction in demand for olivine products required more long-term measures than the continued use of temporary layoffs, which was the strategy that it had employed in response to the reduced demand thus far (Roberts, 2009).

Mineral Fuels and Other Sources of Energy

Norway had a highly developed natural gas and petroleum sector. Natural gas production had been steadily increasing and petroleum production had been decreasing. Crude petroleum production fell to 1.9 million barrels per day (Mbbl/d) in 2009 from 2.1 Mbbl/d in 2008. One issue that had hampered the development of natural gas and petroleum reserves in the northern Barents Sea area was the lack of a defined maritime boundary between Norway and Russia. An agreement was worked out between Russia's state-owned company OAO Gazprom and Norway's state-owned StatoilHydro ASA, however, in which the companies would work together in exploring and developing their Arctic sea regions. A memorandum of understanding was to be signed between the two state-owned companies in 2009 (U.S. Energy Information Administration, 2009a).

A United Nations commission ruled that the Norwegian Continental Shelf (NCS) extends further north than the automatic 200 nautical miles limit, adding 235,000 square kilometers (km^2) of territory in the Arctic Ocean, Barents Sea, and Norwegian Sea to the country's domain. The Norwegian Petroleum Directorate stated that most of the additional area is at water depths of more than 2,500 meters (m) and is on oceanic crust, where natural gas and petroleum were unlikely to be present (Petroleum Economist, 2009, p. 32).

Coal.—Store Norske Spitsbergen Grubekompani A/S (Store Norske) was Norway's sole coal producer and the most northerly operator in the world. Norway continued to be a net exporter of coal from two mines on Svalbard: Svea Nord, which is located south of Longyearbyen, and the Gruve 7 Mine. About one-half of Store Norske's production was used in the country's only coal-fired power station on Spitsbergen Island (Store Norske Spitsbergen Grubekompani A/S, 2009).

Natural Gas.—Norway had estimated proven reserves of 2.3 trillion cubic meters of natural gas as of January 2009. Norway's natural gas production had been increasing every year since 1994. The annual increases had been sustained by incorporating new fields in the Barents Sea and the Norwegian Sea. Norway's single largest natural gas field was the Troll-Oseberg field, which produced about 81 million cubic meters per day in 2009 and represented about one-third of Norway's natural gas production (U.S. Energy Information Administration, 2009b).

Royal Dutch Shell plc of the Netherlands, which was Europe's leading petroleum company, announced that it had made a natural gas discovery at a record depth of 1,376 m in the northern Norwegian Sea that could be equal to the size of Norway's total annual production of natural gas. The find was made in the Gro prospect 360 kilometers (km) offshore and was estimated to hold between 10 billion and 100 billion cubic meters of natural gas. The market value of the well was reported to be an estimated $228 billion. It was considered to be a significant find for the Norwegian Sea and could be a major boost for the Norwegian energy industry (Alexander's Gas & Oil Connections, 2009).

StatoilHydro made a deepwater natural gas discovery in the Asterix prospect in production license 327B, which is located 80 km west of the Luva natural gas field. The water depth at the location is 1,360 m. The estimated recoverable volume was about 16 billion cubic meters and represented one of the larger discoveries offshore Norway in recent years. The resources are located in the Upper Cretaceous reservoirs. The company was considering development of the prospect along with the Luva and the Snefrid South prospects, which are located nearby. Development of the prospects could form the basis for a deepwater gas infrastructure in the Norwegian Sea (Offshore Engineer, 2009, p. 16).

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Petroleum.—Norway, which has the largest petroleum reserves in Western Europe, was reported to have 6.7 billion barrels of estimated proven reserves as of January 2009. All the reserves are located offshore on the NCS, which is divided into three sections: the Barents Sea, the North Sea, and the Norwegian Sea. The bulk of production had taken place in the North Sea, and smaller amounts had been produced in the Norwegian Sea. Norway produced about 2.47 Mbbl/d of petroleum, of which 91% (2.25 Mbbl/d) was exported. This made Norway the world's third ranked petroleum exporter after Saudi Arabia and Russia and the sixth ranked net oil exporter in the world (U.S. Energy Information Administration, 2009c).

The Government reported that a total of 65 exploration wells had been spudded in 2009. This was nine more than in 2008 and a new record. There were 28 new discoveries compared with 25 new discoveries in 2008. Of the 65 exploration wells, 44 were wildcat wells and 21 were appraisal wells. The exploration activity level was the highest in the North Sea, which is where the majority of the discoveries had been proven. The discoveries were generally small and close to existing fields. Norway's production continued to decline as reserves were not being replaced (Norwegian Petroleum Directorate, 2010).

The *Transocean Searcher* drilling rig started drilling the first of StatoilHydro's 13 production wells on the Gjoa field. Gjoa is located in the Sogen area about 75 km northeast of the Troll B platform. The rig was expected to drill nine petroleum wells and four natural gas wells. With this development, a new part of the North Sea would be opened for natural gas and petroleum production. The Vega and the Vega South satellites would be developed with subsea installations and tied back to Gjoa. The development of the Gjoa, the Vega, and the Vega South was the largest development project on the NCS. StatoilHydro was the operator for the development phase and Gaz de France Suez would assume operatorship when production starts (Rigzone.com, 2009).

In the 20th exploration round in 2009, OMV (Norge) AS was awarded two new licenses—PL 529, which was a 676-km^2 area, and PL537, which was a 597-km^2 area and the northernmost license in Norway. Both licenses are located in the Barents Sea. OMV (Norge) had interests in eight licenses: five in the Barents Sea, which was an emerging exploration area, two in the North Sea, and one in the Norwegian Sea. Five of these licenses were operated by OMV (Norge) (Oilvoice.com, 2009).

Renewable Energy.—The Ministry of Petroleum and Energy announced a new bill on alternative energy generation at sea. The new bill would help in developing major investments in offshore wind power generation. A significant part of the new offshore wind parks could be placed off the northern coast of Norway in areas of prevalent Arctic winds. The areas most suitable for wind power would be selected after the Parliament's adoption of the bill. Several of the projected offshore windmills are up to 100-m high and would generate more than 20 gigawatthours per year of electricity. The focus on wind power comes at a time when the Government-owned power grid operator, Statnett SF, was planning major grid-capacity extensions in the region. The extended capacity could open up a number of new industrial initiatives in the region (Barents Observer, 2009).

Outlook

Norway's economy is highly dependent upon the country's hydrocarbon resources—they are the country's single largest source of revenue—and the Government is expected to continue to manage these resources. Exploring for and proving undiscovered resources is a prerequisite for recovering the mineral fuel resources. Continued exploration drilling in frontier areas in the Norwegian Sea and the Barents Sea will likely continue. The Norwegian Petroleum Directorate is expected to continue with efforts to open up new offshore areas, particularly in the Arctic region. Norway is expected to continue to obtain nearly all its electricity from hydropower; however, other renewable resources, such as osmotic power and wind power, are being investigated. Industrial minerals are expected to continue to be important to the nation's domestic economy.

References Cited

Alcoa Inc., 2008, Alcoa and ORKLA ASA agree to exchange equity stakes: Alcoa Inc., December 22. (Accessed March 11, 2010, at http://www.alcoa.com/norway/en/news/releases/2008_orkla_exchange.asp.)

Alexander's Gas & Oil Connections, 2009, Shell's gas find in Norway may be biggest in 12 years: Alexander's Gas & Oil Connections. (Accessed September 8, 2009, at http://www.gasandoil.com/goc/company/cne93393.htm.)

Barents Observer, 2009, Norway finds future in windmills: Alexander's Gas & Oil Connections. (Accessed October 19, 2009, at http://www.gasandoil.com/goc/news/nte93548.htm.)

Dimireva, Ina, 2010, Norway—Economic overview: EUbusiness.com. (Accessed September 20, 2010, at http://www.eubusiness.com/europe/norway/econ.)

European Free Trade Association, 2009, The EFTA states and GCC sign free trade agreement: European Free Trade Association, June 22. (Accessed June 23, 2009, at http://www.efta.int/content/free-trade/efta-countries/GCC-cooperation/the-efta-states-and-gcc-sign-free-trade-agreement.)

Gambogi, Joseph, 2010, Titanium and titanium dioxide: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 174-175.

Metal Bulletin, 2009, BHP's cobalt tolling deal at Nikkelverk will end this year: Metal Bulletin, no. 9112, August 18, p. 4.

Metals Economics Group, 2009, Sydvaranger: Metals Economics Group. (Accessed October 27, 2009, via http://services.metalseconomics.com/Minesearch/Default.aspx?profile&projAid=97231.)

Norges geologiske undersøkelse [Geological Survey of Norway], 2010, Mineralressurser I Norge 2009 [Mineral Resources in Norway 2009]: Trondheim, Norway, Norges geologiske undersøkelse publikasjon no. 1 2010, 45 p. (Accessed December 18, 2010, at http://www.ngu.no/upload/Publikasjoner/Rapporter/2010/Mineralressurser i Norge-2009-no.pdf.)

Norwegian Petroleum Directorate, 2010, The shelf in 2009—Exploration: Norwegian Petroleum Directorate, January 15. (Accessed December 27, 2010, at http://www.npd.no/en/news/News/2010/The-shelf-in-2009/Exploration-in-2009-Record-activity-level.)

Offshore Engineer, 2009, Norwegian double for StatoilHydro: Offshore Engineer, v. 34, no. 4, April, p. 16.

Oilvoice.com, 2009, OMV wins two new exploration licenses in Norway: Alexander's Gas & Oil Connections. (Accessed September 8, 2009, at http://www.gasandoil.com/goc/company/cne93179.htm.)

Petroleum Economist, 2009, Western Europe: Petroleum Economist, v. 76, no. 5, May, p. 32.

Reuters, 2009, Norsk Hydro ASA to close facility at Karmoy: Thomson Reuters. (Accessed December 27, 2010, at http://www.reuters.com/sectors/industries/significant?industryCode=51213&categoryId=2.)

Rigzone.com, 2009, StatoilHydro kicks off drilling at Gjoa, plans to tie-in Vega satellites: Rigzone.com, January 5. (Accessed January 12, 2009, at http://www.rigzone.com/news/article.asp?a_id=71253.)

Roberts, Jessica, 2009, NCM suspends olivine mines: Industrial Minerals, July 21. (Accessed February 23, 2011, at http://www.indmin.com/Article/2256813/NCM-suspends-olivine-mines.html.)

Digitized by Google

Store Norske Spitsbergen Grubekompani A/S, 2009, Home page: Store Norske Spitsbergen Grubekompani A/S. (Accessed December 27, 2010, at http://www.snsk.no.)
U.S. Census Bureau, 2009a, U.S. exports to Norway by 5-digit end use code 2005-2009: U.S. Census Bureau. (Accessed December 24, 2010, at http://www.census.gov/foreign-trade/statistics/product/enduse/exports/c4039.html.)
U.S. Census Bureau, 2009b, U.S. imports from Norway by 5-digit end use code 2005-2009: U.S. Census Bureau. (Accessed December 24, 2010, at http://www.census.gov/foreign-trade/statistics/product/enduse/imports/c4039.html.)
U.S. Energy Information Administration, 2009a, Norway—Background: U.S. Energy Information Administration country analysis brief. (Accessed January 21, 2010, at http://www.eia.doe.gov/emeu/cabs/Norway/Background.html.)
U.S. Energy Information Administration, 2009b, Norway—Natural gas: U.S. Energy Information Administration country analysis brief. (Accessed January 21, 2010, at http://www.eia.doe.gov/emeu/cabs/Norway/NaturalGas.html.)
U.S. Energy Information Administration, 2009c, Norway—Oil: U.S. Energy Information Administration country analysis brief. (Accessed January 21, 2010, at http://www.eia.doe.gov/emeu/cabs/Norway/Oil.html.)
Xstrata plc, 2009 Nikkelverk refinery: Xstrata plc. (Accessed December 27, 2010, at http://www.xstratanickel.com/EN/Operations/Pages/NikkelverkRefinery.aspx.)

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TABLE I

NORWAY: PRODUCTION OF MINERAL COMMODITIES[1]

(Thousand metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008	2009[e]
METALS						
Aluminum:						
Primary	metric tons	1,376,500	1,422,000	1,304,400	1,368,000 r	1,130,000
Secondary	do.	362,400	349,200	350,000	350,000 e	350,000
Cadmium, smelter	do.	153	125	269	178	249 2
Cobalt, metal, refined	do.	5,021	4,927	3,939	3,719	3,510 2
Copper, metal, refined, primary and secondary	do.	38,500	39,700	34,212	32,000 e	32,000
Iron and steel:						
Iron ore and concentrate, Fe content		448 r	397 r	403 r	477 r	896 2
Metal:[e]						
Pig iron		100	100	100	100	100
Ferroalloys:						
Ferromanganese		130	130	130 r	130 r	130
Ferrosilicomanganese		290	250	280 r	260 r	150
Ferrosilicon, 75% basis		165	93	90	250 r	207 2
Silicon metal		176	150	146 r	180 r	170 2
Other		60	60	60	60	50
Total		820 r	680 r	710 r	880 r	707
Steel, crude		701	679	740	560	579 2
Semimanufactures, rolled		650	600	650	600	600
Mercury	metric tons	34	23	45	33	30
Nickel:						
Mine output:						
Concentrate[e]	do.	130	400	600	900	850
Ni content	do.	100	362	246	377 r	336 2
Metal, primary	do.	84,900	81,974	87,590	88,741	87,000
Titanium:[e]						
Ilmenite concentrate		860	850	882 2	915 2	671 2
TiO_2 content		388	385	390	403 r	289 2
Zinc, metal, primary	metric tons	151,285	160,670	157,027	145,469	138,973 2
INDUSTRIAL MINERALS						
Cement, hydraulic[e]		1,900	1,850	1,800	1,800	1,700
Clays		230	320	319	279	275
Feldspar		270	65	65	62	48 2
Graphite	metric tons	8,893	9,000	1,400	4,100 r	4,562 2
Lime, hydrated, quicklime[e]		60 r	70 r	70 r	110 r	100
Mica, flake[e]	metric tons	2,700	2,700	1,000	1,000	--
Nepheline syenite[e]		320	330	312 2	346 2	270
Nitrogen, N content of ammonia		300	350	350	350	300
Olivine sand		3,100 e	3,000 e	2,562 2	2,554 2	1,267 2
Sand and gravel		1,500	13,418	15,325	14,817	13,047 2
Stone, crushed:						
Dolomite		513	525 e	826	744	544 2
Limestone		7,200 e	7,200 e	8,770	6,781	6,151 2
Quartz and quartzite		909	834	1,067	1,025	773 2
Sulfur, byproduct:[e]						
Metallurgical		80 2	80	80	80	80
Petroleum		20	20	20	20	20
Total		100	100	100	100	100
Talc, soapstone, steatite		34	57	66	38	23 2
MINERAL FUELS AND RELATED MATERIALS						
Coal, all grades		300 e	236	322	343	244 2
Gas, natural, marketed[3]	million cubic meters	84,964	87,600	89,700	99,200	99,000
Peat, for agricultural use	do.	--	78	159	497	500

See footnotes at end of table.

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TABLE 1—Continued

NORWAY: PRODUCTION OF MINERAL COMMODITIES[1]

(Thousand metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008	2009[e]
MINERAL FUELS AND RELATED MATERIALS—Continued						
Petroleum:						
Crude[4]	thousand 42-gallon barrels	964,290	965,000	923,940	901,550	854,830 [2]
Natural gas liquids[e]	do.	60,879 [2]	60,000	60,000	50,000	50,000
Refinery products:[e]						
Naphtha	do.	10,017 [2]	10,000	10,000	10,000	10,000
Gasoline	do.	28,078 [2]	28,000	28,000	28,000	28,000
Kerosene	do.	5,771 [2]	5,800	5,800	5,800	5,800
Distillate fuel oil	do.	50,121 [2]	50,000	50,000	50,000	50,000
Residual fuel oil	do.	11,806 [2]	12,000	12,000	12,000	12,000
Other products	do.	4,194 [2]	4,000	4,000	4,000	4,000
Refinery fuel and losses	do.	2,977 [2]	3,000	3,000	3,000	3,000
Total	do.	112,964 [2]	113,000	113,000	113,000	113,000

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. do. Ditto. -- Zero.

[1]Table includes data available through October 31, 2010.

[2]Reported figure.

[3]Reported as total methane sales.

[4]Excluding natural gas liquids.

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TABLE 2
NORWAY: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum		Hydro Aluminium ANS (Norsk Hydro ASA, 70%)	Smelters at Ardal, Hoyanger, Husnes, Karmoy, and Sunndal	600
Do.		do.	Plant at Holmestrand	90
Do.		Elkem Aluminium ANS (Alcoa Inc., 100%)	Smelters at Lista and Mosjoen; anode plant at Mosjoen	282
Do.		Sør-Norge Aluminium ASA (Norse Hydro A/S, 50%, and Rio Tinto Alcan, 50%.)	Smelter at Husnes	165
Cadmium		Norzink A/S (Outokumpu Oyj, 100%)	Smelter at Eitrheimsneset	0.3
Cement		Norcem A/S	Plants at Brevik and Kjopsvik	2,150
Coal		Store Norske Spitsbergen Grubekompani A/S	Mines at Longyearbyen and Svea	450
Cobalt		Nikkelverk A/S (Xstrata plc, 100%)	Smelter at Kristiansand	5
Copper:				
Ore, Cu content		Nikkel og Olivin A/S (Outokumpu Oyj, 100%)	Mine at Narvik	1
Metal		Nikkelverk A/S (Xstrata plc, 100%)	Smelter at Kristiansand	40
Dolomite		Franzefoss Bruk A/S	Mine at Ballagen	350
Do.		Norwegian Holding A/S	Mines at Hammerfall, Logavlen, and Kvitblikk	500
Feldspar		Franzefoss Bruk A/S	Mine at Lillesand	100
Ferroalloys		Elkem Salten (Elkem A/S, 100%)	Ferrosilicon plant at Straumen	90
Do.		Elkem Bjolvefossen (Elkem A/S, 100%)	Ferrosilicon plant at Alvik	60
Do.		Elkem Thamshavn (Elkem A/S, 100%)	Ferrosilicon plant at Orkanger	60
Do.		Finnfjord Smelteverk A/S, Rana Metal (FESIL ASA, 100%)	Ferrosilicon plant at Mo i Rana	110
Do.		A/S Hafslung Metal (FESIL ASA,100%)	Ferrosilicon plant at Sarpsborg	75
Do.		Ila og Lilleby Smelteverk (FESIL ASA, 100%)	Ferrosilicon plant at Finnsnes	20
Do.		Oye Smelteverk (Tinfos Jernverk A/S, 100%)	Silicomanganese plant at Kvinesdal	235
Iron, metal		Ulstein Jernstoperi A/S	Hordvikneset	10
Iron ore		Rana Gruber A/S (Norsk Jernverk Holding A/S, 100%)	Mine at Mo i Rana	2,000
Do.		Northern Iron Ltd.	Bjornevatin, Fisketin Ost, Hyttemalmen, and Kjelimannsasen mines, northern Norway	7,000
Do.		Arctic Bulk Minerals A/S	Mine and plant at Kirkenes	1,500
Lime		Hylla Kalkverk (Nikolai Bruch A/S, 100%)	Verdal/Trondheim Mine and plant	80
Do.		A/S Norsk Jernverk	Plant at Mo i Rana	48
Do.		Ardal og Sunndal Verk A/S	More og Romsdal Mine at Surnadal	20
Do.		Breivik Kalkverk A/S	Alesund Mine at Larsnes	20
Do.		Mjoendalen Kalkfabrik	Plant at Asen/Drammen	7
Limestone		Norcem A/S	Dalen, Bjorntvedt, and Kjopsvik Mines	1,600
Do.		Vardelskalk A/S (Franzefoss Burk A/S, 100%)	Sandvika Mine	800
Do.		Breivik Kalkverk A/S	Visnes and Glaerum Mines	500
Magnesium		Norsk Hydro ASA (Government, 51%)	Plants at Porsgrunn and Sauda	50
Manganese, alloys		Eramet SA	do.	500
Natural gas	million cubic meters	StatoilHydro ASA	Gama, Gullfaks, Sleipner Ost, and Statfjord field	12,270
Do.	do.	Phillips Petroleum Company Norway	Ekofisk field	9,900
Do.	do.	Elf Petroleum Norge A/S	Frigg, Heimdal, and Ost-Frigg fields	5,750
Do.	do.	Norsk Hydro Produksjon A/S	Troll-Oseberg field	2,600
Do.	do.	StatoilHydro ASA	Mikkel field	2,100
Do.	do.	Total S.A., 40%; Petoro S.A., 30%; Marathon Petroleum Norge AS, 20%; Norsk Hydro Produksjon A/S, 10%	Skirne field	1,550
Do.	do.	BP Petroleum Development of Norway	Gyda and Ula fields	1,040
Do.	do.	Esso Norge A/S	Odin field	1,000
Do.	do.	Amoco Norway A/S	Hod and Valhall fields	910
Nepheline syenite		North Cape Mineral A/S (Unimin Corp., 84%)	Mine at Stjernoy	350
Nickel:				
Ore, Ni content		Nikkel og Olivin A/S (Outokumpu Oyj, 100%)	Mine at Narvik	3
Do.		Titania A/S (Kronos Norge A/S, 100%)	Mine at Tellnes	0.5
Metal		Nikkelverk A/S (Xstrata plc, 100%)	Smelter at Kristiansand	85
Olivine		North Cape Minerals A/S (Sibelco Group, 89%, and Franzefoss A/S, 11%)	Aheim Mine and plant	2,500
Do.		do.	Stranda Mine and plant	300
Do.		Franzefoss Bruk A/S	Lefdal Mine at Bryggja	500

See footnotes at end of table.

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TABLE 2—Continued
NORWAY: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Petroleum	42-gallon barrels per day	StatoilHydro ASA (Government, 100%)	Gullfaks, Statfjord, Tommeliten, and Veslefrikk fields	1,069,300
Do.	do.	Norsk Hydro Produksjon A/S	Brage, Mime, and Oseberg fields	566,200
Do.	do.	Phillips Petroleum Company Norway	Ekofisk field	237,500
Do.	do.	Saga Petroleum A/S	Snorre field	170,000
Do.	do.	BP Petroleum Development of Norway	Gyda and Ula fields	155,000
Do.	do.	A/S Norske Shell	Draugenfield	90,000
Do.	do.	ExxonMobil Refining & Supply Co.	Slagen refinery	110,000
Do.	do.	Statoil Mongstad	Mongstad refinery	200,000
Pyrite		Folldal Verk A/S (Norsulfid A/S, 100%)	Mine at Hjerkinn	10
Quartzite		Elkem Tana (Elkem A/S, 100%)	Mine at Tana	540
Do.		Elkem Marnes (Elkem A/S, 100%)	Mine at Sandhornoy	200
Do.		Vatnet Kvarts A/S	Mine at Nordland	150
Do.		Snekkevik Kvartsbrudd	Mine at Kragero	110
Silicon metal		Lilleby Metall A/S (FESIL ASA, 100%)	Plant at Trondheim	9
Do.		FESIL ASA	Plant at Holla	50
Steel		Fundia AB (Norsk Jenverk, 50%, and Rautaruukki Group, 50%)	Plants at Christiania, Mandal Stal, Mo i Rana, and Spigerverk	600
Talc		A/S Norwegian Talc (Pluess-Staufer AG, 51%)	Mine and plant at Altermark/Knarrevik and Framfjord	90
Do.		Kvam Minerals A/S	Mine and plant at Kvam	6
Titanium, concentrate		Titania A/S (Kronos Norge A/S, 100%)	Mine at Tellnes	915
Zinc, metal		Norzik A/S (Outokumpu Oyj, 100%)	Smelter at Odda	150

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THE MINERAL INDUSTRY OF POLAND

By Mark Brininstool

Poland had significant mineral reserves of several mineral commodities and also had important mineral processing facilities. In 2009, Poland was estimated to be the world's 9th ranked producer of silver, the 10th ranked producer of mined copper, and a significant producer of rhenium. Industrial minerals, such as aggregates, feldspar, gypsum, lime, salt, and sulfur were also produced in significant quantities. For mineral fuels, Poland was the 9th ranked producer of bituminous coal but was mostly dependent on imports of oil and gas (Ney and Smakowski, 2009, p. ix, xi; Brooks, 2010; Cordier, 2010; Crangle, 2010; Edelstein, 2010; Kostick, 2010; Miller, 2010; Ober, 2010; World Energy Council, 2010, p. 3).

Minerals in the National Economy

In 2009, Poland's real gross domestic product (GDP) increased by 1.7% compared with the GDP in 2008. Manufacturing accounted for about 14.9% of the total GDP at current prices and mining and quarrying made up about 2.2%. In 2008 (the latest year for which data were available), the total value of mineral commodity production was estimated to be $21.8 billion,[1] of which mineral fuels accounted for 53%; metallic raw materials, 24%; and industrial minerals, 23%. The two most important individual minerals in terms of value were bituminous coal and copper, which made up about 41% and 18%, respectively, of the value of Poland's mineral commodity production (Ney and Smakowski, 2009, p. xi, xiii; Central Statistical Office of Poland, 2010b; Dmochowska, 2010, p. 473).

The growth of Poland's GDP slowed considerably compared with the 5% growth realized in 2008, but Poland was the only country in the European Union (EU) to show growth of its GDP in 2009. Poland's economy performed better during the world economic crisis in 2009 than most of the other countries in the EU and in Central and Eastern Europe because it had a relatively low ratio of exports to GDP, because the significant depreciation of the Polish zloty exchange rate in relation to the U.S. dollar and the euro made Polish exported goods (including mineral-based products) more competitively priced in foreign markets, and because Poland did not have the same problems with external debt that many of its neighbors had (National Bank of Poland, 2010, p. 32-34).

In 2008 (the latest year for which data were available), Poland had a mineral commodity trade deficit valued at about $23.1 billion in current (2008) prices. The deficit was driven by trade in mineral fuels, which had a negative trade balance of about $23.5 billion (including $14.3 billion for crude oil and $9.0 billion for natural gas). Metals had a positive trade balance of about $880 million (the leading export, refined copper, had a positive trade balance of about $1.9 billion), and industrial minerals had a negative trade balance of about $820 million. Fertilizers were also included in the mineral commodity trade balance and had a positive balance of about $290 million (Ney and Smakowski, 2009, p. xx).

Complete trade data for mineral commodities were not available for 2009, and the trade data that were available were slightly inconsistent with the values in the previous paragraph (which were converted from Polish zlotys); nonetheless, a review of trade data for some of the minerals that had a significant effect on the terms of trade is useful to show that overall trade in 2009 could have differed significantly compared with that of 2008. Because the percentage changes could be significantly different depending on whether they are expressed in terms of dollars or Polish zlotys, the trade data below show trade values in both dollars and Polish zlotys as reported by the Central Statistical Office of Poland. Percentage changes are based on comparisons with 2008 Central Statistical Office of Poland data so they may not equal the percentage change when using the data in the previous paragraph to compare figures. In 2009, the crude petroleum trade deficit was valued at about 25.9 billion zlotys (a 24.9% decrease), or $8.4 billion (a 43% decrease), and the copper and copper alloys trade surplus was valued at about 4.6 billion zlotys (a 15.3% decrease), or $1.5 billion (a 10% decrease). Because of the significant effect that these two commodities had on the trade balance of mineral products in previous years, the overall trade deficit in 2009 could be expected to be lower than that of 2008. Statistics for the value of natural gas trade (second ranked, following crude oil, in importance for the mineral commodity terms of trade) were not available for 2009 (Central Statistical Office of Poland, 2009; 2010a).

Government Policies and Programs

Mining activities are regulated by the Polish Geological and Mining Law of February 4, 1994. The trade, distribution, and storage of gaseous fuels are additionally regulated by the Act on Reserves of Crude Oil, Petroleum Products and Natural Gas dated February 16, 2007, and the Polish Energy Law of April 10, 1997. Probably the most important Government program in regards to the mineral industry was the Privatization Programme for the Years 2008-2011. The privatization program included important mining and energy companies, which are discussed in the Structure of the Mineral Industry section below (Polskie Gornictwo Naftowe i Gazownictwo S.A., 2009a, p. 41-43).

Production

Although Poland's economy performed well in 2009 relative to other EU countries, the slowdown in economic growth seemed to affect the volume of mineral production. Production of most metals was reported to have decreased significantly with the exception of copper and silver mine production, each

[1]Where necessary, values have been converted from Polish zlotys (Zl) to U.S. dollars (US$) at an annual average exchange rate of Zl 2.41=US$1.00 for 2008 and Zl 3.12=US$1.00 for 2009.

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of which increased slightly. Ferroalloys production decreased by 83%; aluminum, by an estimated 51%; pig iron, by about 40%; rhenium, by 29%; lead content of concentrates and lead metal production, by 29% and 11%, respectively; crude steel, by 27%; zinc mine output, by 16%; and cadmium, by 11%. Most production that was reported for industrial minerals decreased in comparison with that of 2008, and most of the remaining industrial mineral production results were estimated to have decreased based on the trend in other commodities and reduced demand from the domestic construction industry. For mineral fuels, coke production decreased by 27%; crude petroleum, by 9%; and coal, by 6% (table 1; Galos, 2009, p. 21).

Structure of the Mineral Industry

The Polish Government (through ownership of shares by the Polish Ministry of Treasury) owned shares in a number of important producers of mineral products but planned to privatize many of its holdings. One of the Government's most important holdings was a 41.79% stake in Poland's sole copper producer, Kombinat Gorniczo Hutniczy Miedzi Polska Miedz S.A. (KGHM). No other shareholders owned more than 5% of the company's shares. In January 2010, the Government sold 20 million shares of KGHM to bring its ownership down to 31.79%. In 2010, the Government also planned to sell 85% of its 100% holding in Zaklady Gorniczo-Hutnicze (ZGH) "Boleslaw" S.A., which was Poland's leading producer of lead and zinc ore and refined zinc (Ministry of Treasury of the Republic of Poland, 2009, p. 13; Kombinat Gorniczo Hutniczy Miedzi Polska Miedz S.A., 2010a, p. 50).

In the mineral fuels sector, the Polish Government owned almost all of Poland's coal producers and oil and gas producers Grupa LOTOS S.A. and Polskie Gornictwo Naftowe i Gazownictwo S.A. (PGNiG). In 2009, the Government reduced its shareholding in bituminous coal producer Lubelski Wegiel Bogdanka S.A., and in the next few years it planned to privatize bituminous coal producers Jastrzebska Spolka Weglowa S.A. and Katowicki Holding Weglowy S.A. and brown coal and lignite mining companies KWB Adamow S.A. and KWB Konin S.A. In 2009, the Government reduced its ownership in PGNiG to 72.94% from 84.75% by transferring shares free of charge to company employees as part of the Government's privatization program. In 2010, the Government planned to reduce its share of Grupa LOTOS S.A., which owned oil and gas and refined petroleum production facilities, to 50.97% from 63.97%. Table 2 is a list of the major mineral industry facilities in Poland (Galos, 2009, p. 22; Ministry of Treasury of the Republic of Poland, 2009, p. 12-13; Polskie Gornictwo Naftowe i Gazownictwo S.A., 2010, p. 22).

Commodity Review

Metals

Copper.—KGHM was the only copper mining and primary copper producing firm in Poland, and it operated three mines (the Lubin, the Polkowice-Sieroszowice, and the Rudna Mines) that had total combined reserves of about 1.3 billion metric tons (Gt) of ore containing about 26 million metric tons (Mt) of copper. Total resources of copper in Poland were about 1.8 Gt of ore containing 36 Mt of copper. KGHM was a significant world producer of copper and silver, representing about 3% of world production of refined copper and 7% of world mine production of silver (Ney and Smakowski, 2009, p. 129; Kombinat Gorniczo Hutniczy Miedzi Polska Miedz S.A., 2010a, p. 108; 2010b).

Copper mine production increased slightly and refined metal production decreased by about 5%. The reduction in electrolytic copper production was reportedly owing to 3 months of maintenance on the Glogow II smelter. Copper production was maintained near 2008 levels in part because KGHM increased exports of copper and copper alloys to Germany and China. Total exports increased by about 12% compared with that of 2008 to 342,334 metric tons (t) in 2009. Poland exported to Germany about 113,000 t of copper and copper alloys (an increase of 85% compared with that of 2008) and to China, about 97,000 t (an increase of 45%). KGHM projected that in 2010 it would produce 512,000 t of refined copper, which would be a 1.9% increase compared with that of 2009 (Central Statistical Office of Poland, 2009; 2010a; Kombinat Gorniczo Hutniczy Miedzi Polska Miedz S.A., 2010a, p. 105, 130).

KGHM's development strategy for 2009-18 addressed the company's main challenges of lowering production costs and increasing the company's resource base. By 2008, the cost of production of refined copper at KGHM had increased by 88% in Polish zlotys (to 11,736 zlotys per metric ton) and 359% in dollars (to $4,878 per metric ton) compared with the cost of production in 2003. In 2009, production costs decreased by 4.8% in Polish zlotys and by 26.4% in dollars compared with the cost of production in 2008. To reduce production costs further, KGHM planned to invest in infrastructure, including constructing a flash furnace at the Glogow I smelter and replacing mining and beneficiation machinery there. The company planned to expand its resource base and increase the production of copper in concentrate to about 700,000 metric tons per year (t/yr) compared with 439,000 t of copper in concentrate in 2009 by investing in further exploration and mining within Poland and internationally (Kombinat Gorniczo Hutniczy Miedzi Polska Miedz S.A., 2010a, p. 102, 125, 129).

Iron and Steel.—Poland had not produced iron ore since 1990 and was dependent on imported iron ore and concentrates for domestic pig iron production. In 2009, Poland imported 3.8 Mt of iron ores and concentrates, which was a 51% decrease in imports compared with those of 2008. About 80% of these imports came from Ukraine and about 14% came from Russia. All the imported iron ore and concentrates was used for pig iron production at ArcelorMittal Poland S.A.'s iron and steel plants at Dabrowa Gornicza and Krakow (Central Statistical Office of Poland, 2009; 2010a; Ney and Smakowski, 2009, p. 239, 241).

The significant reduction in crude steel production was owing to the world financial crisis and the resulting reduction in demand for steel products. Unlike many of the Central and Eastern European steel producing countries, Poland had a significant domestic market for steel products, and a major reason for the decrease in crude steel production was reduced domestic consumption. According to the Polish Steel

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Association, Polish apparent consumption of finished steel products in 2009 was about 8 Mt, which was a 30% decrease compared with that of 2008, and employment in the steel industry decreased by 10.7% compared with that of 2008, to 26,293 persons (Polish Steel Association, 2010, p. 23-24, 26).

Huta Malapenew S.A. and Huta Zygmunt S.A. were removed from the list of crude steel producers in table 2 because it is now believed that these two companies produced only cast steel products and not crude steel. In the table, the company name Huta Stalowa Wola S.A. was changed to Huta Stali Jakosciowych S.A. because Huta Stalowa Wola's crude steel production capacity was spun off into Huta Stali Jakosciowych in 2006; the company was later purchased by Zlomrex S.A. (table 2).

Lead and Zinc.—In table 1, significant revisions were made to the production of lead content of concentrate. The data that the Central Statistical Office of Poland had previously reported as lead content of concentrate production was reclassified as lead content of ores and concentrate. The new figures are taken from the Minerals Yearbook of Poland 2008, which was published by the Mineral and Energy Economy Research Institute of the Polish Academy of Sciences (table 1).

Several important events affected the structure of the lead and zinc industry in 2009. ZGH "Boleslaw" S.A. was the only remaining producer of lead and zinc ores and concentrate after Zaklady Gorniczo "Trzebionka" S.A. stopped production of lead and zinc ore in early 2009 owing to the exhaustion of reserves. The shutdown of Zaklady Gorniczo "Trzebionka" S.A. was the main reason for the significant decrease in production of lead and zinc mine output in 2009. ZGH "Boleslaw" S.A. began discussions about a possible merger with Huta Cynku Miasteczko Slaskie (HCM) S.A. and planned to take over HCM S.A. at the end of 2009, but it was unknown whether this merger took place. Mining of lead and zinc ore at the ZGH "Boleslaw" mines at Olkusz and Pomorzany was expected to end in 2013 although mining activities could continue for an additional 20 years if new reserves are successfully developed (Galos, 2009, p. 25; Metal Bulletin, 2009; Ney and Smakowski, 2009, p. 264).

Rhenium.—KGHM Ecoren S.A. began production of ammonium perrhenate (APR) from sulfuric acid waste of copper processing in 2006 and was the only producer of APR from its own sources in Europe. In late 2009, KGHM Ecoren opened a new facility at the Glogow I copper smelter for the production of rhenium eluate (the solution from which APR is produced), and the company planned to open a metallic rhenium production plant with a capacity of 3.5 t/yr of rhenium pellets in 2010. KGHM Ecoren was a significant world producer of rhenium, which is an important additive in superalloys used in jet engines and catalysts (Galos, 2009, p. 24; KGHM Ecoren S.A., 2010, p. 24).

Mineral Fuels

Coal.—As of the end of 2008, Poland had bituminous coal reserves of about 16 Gt and proved reserves of about 4.3 Gt and was the leading producer of bituminous coal in the EU. Reserves were not expected to be expanded owing to environmental concerns, difficult geologic conditions, and the low quality of the coal. As of the end of 2008, brown coal and lignite reserves were about 13.6 Gt and proved reserves were about 1.4 Gt. Coal was the main source of electrical production in Poland, and in 2008 (the latest year for which data were available), bituminous coal accounted for 68% of primary electricity production, and brown coal and lignite, about 18%. Bituminous coal producer KWK Budryk S.A. was removed from the list of bituminous coal producers in table 2 because in January 2008 it was incorporated into Jastrzebska Spolka Weglowa S.A. (Ney and Smakowski, 2009, p. 221-223, 273).

The Polish Government was undertaking a privatization program that included a number of coal producers. By the end of 2009, the Government reduced its shareholding in bituminous coal producer Lubelski Wegiel Bogdanka S.A. to 60.53% from 96.81% by issuing 11 million new company shares on the Warsaw Stock Exchange in June. The Government planned to sell 56% of its remaining shares in Bogdanka in 2010 to further reduce its shareholding. The Government also planned to privatize bituminous coal producers Jastrzebska Spolka Weglowa S.A. and Katowicki Holding Weglowy S.A. in the next few years through listings on the Warsaw Stock Exchange. In 2010, the Government planned to sell 85% of its 100% share in brown coal and lignite mining companies KWB Adamow S.A. and KWB Konin S.A. (Galos, 2009, p. 22; Ministry of Treasury of the Republic of Poland, 2009, p. 12; Lubelski Wegiel Bogdanka S.A., 2010, p. 72, 107; Warsaw Stock Exchange, 2010).

Natural Gas and Petroleum.—In 2009, Poland produced about 5.5 billion cubic meters of natural gas and 5.1 million barrels (Mbbl) of crude oil but was dependent on imports for the majority of its supplies. About 1.3 Mbbl of crude petroleum and about 19.5 million cubic meters of gas were produced by LOTOS Petrobaltic S.A. in the Baltic Sea Shelf; the remaining oil and gas production took place on the Polish mainland. In 2009, Poland imported about 61.5 Mbbl of crude oil (a 43% decrease compared with that of 2008), of which 92% was from Russia. Trade statistics for total natural gas imports were not available, but PGNiG imported about 9.14 billion cubic meters of natural gas (an 11% decrease compared with that of 2008), of which 89% came from Russia and 11% from Germany. In 2008 (the latest year for which data were available), PGNiG accounted for about 97% of all natural gas imports into Poland (Central Statistical Office of Poland, 2009, 2010a; Ney and Smakowski, 2009, p. 182; Grupa LOTOS S.A., 2010, p. 49; Polskie Gornictwo Naftowe i Gazownictwo S.A., 2010, p. 43).

Poland's dependence on oil and gas from Russia had led the country to seek alternative sources of supply. The need for diversification was demonstrated when, from January 7 to January 21, natural gas supplies from Russia through Ukraine were cut off owing to a dispute between Russia and Ukraine concerning payments for natural gas. Although deliveries to Poland through Belarus were increased to make up for some of the missed deliveries and although there was no serious shortage of natural gas, the incident demonstrated Poland's potential vulnerability of relying on one source for so much of its energy needs (Polskie Gornictwo Naftowe i Gazownictwo S.A., 2010, p. 10, 26).

To diversify Poland's resource base of energy fuels, Polish companies had worked on developing domestic deposits

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and obtaining exploration and development rights for foreign deposits. PGNiG, which accounted for about 75% of total oil and gas production in Poland in 2009, planned to increase its domestic production capacity of crude oil to 1 Mt (about 7.4 Mbbl) by 2013 through the development of the Lubiatow-Miedzychod-Grotow fields, and to increase its natural gas production capacity to about 4.5 billion cubic meters. PGNiG was also involved in exploration and production activities in Denmark, Egypt, Libya, Norway, and Pakistan (Polskie Gornictwo Naftowe i Gazownictwo S.A., 2010, p. 32, 38-40).

Another potential source of domestic natural gas supply production that generated significant attention in 2009 was shale gas. Such American companies as BNK Petroleum Inc., ConocoPhillips Co., Exxon Mobil Corp., Chevron Corp., and Marathon Oil Corp. had shale gas exploration licenses in Poland. Shale gas in Poland received a relatively large amount of press attention but sufficient exploration to identify reserves had not been conducted and a number of challenges, including environmental concerns and production costs, still needed to be addressed before shale gas could become an important source of natural gas.

PGNiG was also looking at ways to diversify sources of imported natural gas. The company planned to increase its import capacity from Germany to 1.9 billion cubic meters from 0.9 billion cubic meters and to build a liquefied natural gas terminal at Swinoujscie on the Baltic Sea. In April, the consortium of companies investing in the Skanled pipeline, which was to transport natural gas from the Norwegian Continental Shelf to Sweden and Denmark, from where some of the natural gas would be shipped on to Poland, chose to discontinue the project. PGNiG was an investor in the project and was opposed to its cancellation (Polskie Gornictwo Naftowe i Gazownictwo S.A., 2009b; 2010, p. 43).

Outlook

The International Monetary Fund estimates that Poland's GDP will increase by 2.75% in 2010 and by 3.25% in 2011. Economic growth and an accompanying increase in domestic demand could lead to increased mineral commodity production, but much of the growth in demand for mineral products could depend on demand by Poland's trade partners, especially those in the EU. Dependence on imports of mineral fuels is expected to remain one of Poland's biggest challenges, and Poland is expected to continue to investigate other potential sources of supply (International Monetary Fund, 2010, p. 16).

References Cited

Brooks, W.E., 2010, Silver: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 146-147.

Central Statistical Office of Poland, 2009, Foreign trade turnover by main commodities January—December 2008: Central Statistical Office of Poland, August 14. (Accessed September 23, 2009, at http://www.stat.gov.pl/gus/5840_975_ENG_HTML.htm.)

Central Statistical Office of Poland, 2010a, Foreign trade turnover by main commodities January- -December 2009: Central Statistical Office of Poland, August 13. (Accessed November 9, 2010, at http://www.stat.gov.pl/gus/ceny_handel_ENG_HTML.htm.)

Central Statistical Office of Poland, 2010b, Gross domestic product in 2009: Central Statistical Office of Poland. (Accessed November 18, 2010, at http://www.stat.gov.pl/gus/5840_1338_ENG_HTML.htm?action=show_archive.)

Cordier, D.J., 2010, Feldspar: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 54-55.

Crangle, R.D., Jr., 2010, Gypsum: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 70-71.

Dmochowska, Halina, ed., 2010, Concise statistical yearbook of Poland 2010: Warsaw, Poland, Central Statistical Office of Poland [Glowny Urzad Statystyczny], June, 724 p.

Edelstein, D.L., 2010, Copper: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 48-49.

Galos, Krzysztof, 2009, Polish coal powers Europe: London, United Kingdom, Mining Journal, October 16, p. 21-25.

Grupa LOTOS S.A., 2010, Directors' report on the operations of Grupa LOTOS S.A. in 2009: Gdansk, Poland, Grupa LOTOS S.A., June, 93 p.

International Monetary Fund, 2010, Article IV consultation—Staff report: Washington, D.C., International Monetary Fund, May, 38 p.

KGHM Ecoren S.A., 2010, Hydrometallurgy division: KGHM Ecoren S.A. (Accessed November 12, 2010, at http://en.ecoren.pl/4919.xml.)

Kombinat Gorniczo Hutniczy Miedzi Polska Miedz S.A., 2010a, Annual report 2009: Lubin, Poland, Kombinat Gorniczo Hutniczy Miedzi Polska Miedz S.A., 144 p.

Kombinat Gorniczo Hutniczy Miedzi Polska Miedz S.A., 2010b, Resource base: Lubin, Poland, Kombinat Gorniczo Hutniczy Miedzi Polska Miedz S.A. (Accessed November 3, 2010, at http://www.kghm.pl/index.dhtml?category_id=260.)

Kostick, D.S., 2010, Salt: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 134-135.

Lubelski Wegiel Bogdanka S.A., 2010, Directors report on operations of Lubelski Wegiel Bogdanka S.A. for the period from 1 January 2009 to 31 December 2009: Bogdanka, Poland, Lubelski Wegiel Bogdanka S.A., 125 p.

Metal Bulletin, 2009, HCM, ZGH Boleslaw discuss takeover details: London, United Kingdom, Metal Bulletin, June 22, p. 10.

Miller, M.M., 2010, Lime: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 90-91.

Ministry of Treasury of the Republic of Poland, 2009, Polish privatization programme for the years 2009-2011: Warsaw, Poland, Ministry of Treasury of the Republic of Poland, September 8, 19 p.

National Bank of Poland, 2010, Annual report 2009: Warsaw, Poland, National Bank of Poland, October, 276 p.

Ney, Roman and Smakowski, Tadeusz, eds., 2009, Minerals yearbook of Poland 2008: Kracow, Poland, Department of Mineral Policy, Mineral and Energy Economy Research Institute, Polish Academy of Sciences, 505 p.

Ober, J.A., 2010, Sulfur: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 158-159.

Polish Steel Association, 2010, Polish steel industry 2010: Polish Steel Association, 57 p. (Accessed November 15, 2010, at http://www.hiph.com.pl ANALIZY_RAPORTY/pliki/pps2010_.pdf.)

Polskie Gornictwo Naftowe i Gazownictwo S.A., 2009a, Annual report 2008: Polskie Gornictwo Naftowe i Gazownictwo S.A., July 31, 184 p. (Accessed September 23, 2009, at http://www.pgnig.pl/pgnig/ri/838/10283?s,main,language=EN.)

Polskie Gornictwo Naftowe i Gazownictwo S.A., 2009b, Comment on decision to suspend Skanled project: Polskie Gornictwo Naftowe i Gazownictwo S.A., April 29. (Accessed November 30, 2010, at http://www.pgnig.pl/pgnig/com/arch/15005?r%2Cnews%2CpageNumber=3&r%2Cnews%2CdateTo=&r%2Cnews%2CdateFrom=&r%2Cnews%2CnewsId=8362.)

Polskie Gornictwo Naftowe i Gazownictwo S.A., 2010, Annual report 2009: Warsaw, Poland, Polskie Gornictwo Naftowe i Gazownictwo S.A., May 24, 76 p.

Warsaw Stock Exchange, 2010, Debuts in 2009: Warsaw Stock Exchange. (Accessed November 10, 2010, at http://www.gpw.pl/gpw.asp?cel=e_informacje&k=45&i=/zrodla/spolkigieldowe/debiuty/debiuty2009en.html&sky=1.)

World Energy Council, 2010, 2010 Survey of energy resources: World Energy Council, October, 608 p. (Accessed November 10, 2010, at http://www.worldenergy.org/documents/ser_2010_report.pdf.)

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TABLE I

POLAND: PRODUCTION OF MINERAL COMMODITIES[1]

(Thousand metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007	2008	2009
METALS						
Aluminum, metal:						
Primary	metric tons	54,508	57,620	54,468 r	47,543	16,851
Secondary[e, 3]	do.	11,800	18,900	21,500	18,000 r	15,000
Total[e]	do.	66,300	76,500	76,000 r	65,500 r	31,900
Cadmium, metal, primary	do.	408	373	421	603	534
Copper:						
Ore:						
Gross weight		30,434	31,279	30,262	29,416	29,700
Cu content	metric tons	575,203	559,894	505,900	482,400	498,960
Concentrate:						
Gross weight		1,977	1,946	1,876	1,866	1,929
Cu content	metric tons	512,000	497,000	452,000	429,400 r	439,000
Metal:						
Smelter:[4]						
Primary	do.	526,600 r	445,100 r	438,100 r	438,600 r	408,200
Secondary	do.	30,000 r	80,000 r	39,800 r	43,800 r	68,800
Total	do.	556,600 r	525,100 r	477,900 r	482,400 r	477,000
Refined, electrolytically, primary and secondary	do.	560,256	556,625	532,975	526,808	502,491
Gold:						
Mine output, Au content of Cu concentrate[e]	kilograms	510	500	450 r	430 r	440
Metal	do.	713	1,700	883	902	814
Iron and steel:						
Pig iron:						
For foundry use		18	21	--	--	--
For steel production		4,458	5,311	5,804	4,934	2,984
Total		4,476	5,332	5,804	4,934	2,984
Ferroalloys:						
Blast furnace, ferromanganese	metric tons	7,800	4,100	2,100	8,500 r	2,000 e
Electric furnace:						
Ferrochromium	do.	--	400	--	--	--
Silicomanganese	do.	10,242	3,310	15,600	25,100 r	3,000 e
Ferrosilicon	do.	65,118	13,034	58,538	56,031	9,685
Other	do.	3,700	4,500	6,200	2,900 r	1,000 e
Total	do.	86,860	25,344	82,438	92,531	15,700 e
Steel, crude:						
From oxygen converters		4,893	5,766	6,188	5,225	3,236
From electric arc furnaces		3,443	4,225	4,433	4,502	3,893
Total		8,336	9,991	10,621	9,727	7,129
Finished steel products:						
Hot rolled		6,294	7,666	8,011	7,610	6,232
Cold rolled		1,600	1,600	1,482	689	558
Pipe		380	417	401	409	347
Lead:						
Mine output:						
Pb content of Pb-Zn ore	metric tons	68,500	67,100	63,700	66,400 r	48,000 e
Pb content of Cu ore	do.	31,200	30,500	15,700	21,300 r	20,000 e
Total	do.	99,700	97,600	79,400	87,700 r	68,000 e
Concentrate, Pb content	do.	50,900 r	50,000 r	47,200 r	47,900 r	34,000
Metal, refined, primary and secondary:						
Primary	do.	29,500	26,200	37,200	40,000	36,000 e
Secondary	do.	51,500	56,600	67,000	68,000	60,000 e
Total	do.	81,000	82,800	104,200	108,000	96,000
Platinum-group metals, average content of slimes:[e, 5]						
Palladium	kilograms	10	10	15	15	15
Platinum	do.	20	20	25	25	25
Rhenium:						
Ammonium perrhenate	do.	--	1,500	3,500	4,900	3,500
Re content of ammonium perrhenate	do.	--	1,000	2,400	3,400	2,400

See footnotes at end of table.

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TABLE 1—Continued

POLAND: PRODUCTION OF MINERAL COMMODITIES[1]

(Thousand metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007	2008	2009
METALS—Continued						
Selenium	metric tons	82	87	85	82 r	80 e
Silver:						
Mine output, Ag content of concentrate	do.	1,263	1,266	1,199	1,161	1,206
Metal	do.	1,293	1,270	1,244	1,221 r	1,230 e
Zinc:						
Zn content:						
Mine output	do.	156,200	144,800	136,100	136,300 r	115,000 e
Concentrate output	do.	135,600	126,600	129,600	132,400 r	104,000
Metal, refined, including secondary	do.	137,300	133,900	141,800	142,600 r	140,000
INDUSTRIAL MINERALS						
Barite, beneficiated	metric tons	2,357	2,143	--	324	--
Cement:						
Clinker		9,468	11,220	13,168	12,443	10,659
Hydraulic		12,646	14,688	17,120	17,207	15,537
Clays and clay products:						
Bentonite						
Crude	metric tons	1,000	--	1,300	3,000	3,000 e
Processed, including imported material	do.	86,331	93,880	105,943	121,031	81,354
Fire clay, crude		156	187	198	181 r	115
Kaolin:						
Crude		326 r	297 r	319 r	318 r	280 e
Beneficiated		157 r	144 r	153 r	166 r	140 e
Diatomite	metric tons	500	600	600	1,000 r	900 e
Feldspar:						
Run of mine	do.	457,400	431,300	497,900 r	599,100 r	550,000 e
Processed, including imported material	do.	490,200	457,600	501,800	583,600 r	540,000 e
Gypsum and anhydrite:						
Natural:						
Gypsum rock		1,048	1,172	1,298	1,283 r	1,200 e
Anhydrite		195	181	194	198 r	180 e
Total		1,243	1,353	1,492	1,481 r	1,380 e
Synthetic gypsum		1,173	1,230	1,338	1,451 r	1,350 e
Grand total		2,416	2,583	2,830	2,932 r	2,730 e
Lime, hydrated and quicklime		1,749	1,936	2,143	1,952	1,716
Magnesite:						
Concentrate	metric tons	55,300	62,500	65,000	60,000 r	55,000 e
Calcined	do.	100	--	--	15 r	15 e
Nitrogen, N content of ammonia		2,079	2,007	1,995	1,995	1,697
Quartz, quartzite, and quartz schist:						
Quartz and quartz crystal, marketable	metric tons	15,800	13,900	7,000	6,500	5,100
Quartzite, refractory, marketable	do.	86,000	16,900	46,100	72,500 r	25,700
Quartz schist, marketable	do.	10,800	10,800	9,500	7,100 r	7,000 e
Salt:						
Rock		1,123	1,130	591	618	989
Other (brine and desalination of mine waste water)		2,823 r	2,899	2,931	2,783 r	2,534
Total		3,946 r	4,029	3,522	3,401 r	3,523
Sand and gravel:						
Aggregates (construction sand and gravel), natural, mine output		99,648 r	116,561 r	139,388 r	149,312 r	140,000 e
Filling sand	thousand cubic meters	6,047	6,197	6,595	6,401 r	6,400 e
Foundry sand		766	762	782	1,244 r	1,617
Lime-sand brick production sand	do.	572	685	905	834 r	840 e
Silica sand (glass sand), marketable		1,593	1,525	2,268	2,398	2,731
Sodium compounds:						
Carbonate (soda ash), 98%		1,189	1,177	1,192	1,190	890
Caustic soda (96% NaOH)		391	462	487	409	382

See footnotes at end of table.

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TABLE 1—Continued

POLAND: PRODUCTION OF MINERAL COMMODITIES[1]

(Thousand metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007	2008	2009
INDUSTRIAL MINERALS—Continued						
Stone, mine output:						
Dimension stone		3,164	3,729	2,661	3,126 r	3,000 e
Dolomite		1,834	2,013	2,232	2,206	1,834
Limestone:						
For lime production		11,233	13,645	15,581	16,110 r	14,500 e
For non-lime end use		22,485	26,314	30,983	30,778 r	28,000 e
Road stone		166	160	141	534 r	500 e
Sulfur:						
Native, Frasch		802	800	834	762	263
Byproduct:						
From natural gas		21	20	23	21	21 e
From oil refineries and coking plants		164	182	188	201 r	180 e
From metallurgy		292	307	304	294 r	260 e
Other		2 r	2	2 r	3 r	3 e
Total		479	511 r	517 r	519 r	464 e
From gypsum[e]		--	--	--	--	--
Grand total		1,281	1,311 r	1,351 r	1,281 r	730 e
MINERAL FUELS AND RELATED MATERIALS						
Carbon black	metric tons	30,500	34,100	41,100	36,300 r	36,000
Coal:						
Bituminous		97,903	95,220	88,313	84,345	78,064
Brown coal and lignite		61,136	60,844	57,538	59,668	57,108
Total		159,039	156,064	145,851	144,013	135,172
Coke		8,518	9,735	10,383	9,761	7,091
Gas:						
Natural	million cubic meters	5,742	5,650	5,653 r	5,382	5,537
Manufactured:						
Town gas	do.	11	10	10	4	4 e
Coke oven gas	do.	3,545	4,101	4,409 r	4,207 r	4,200 e
Total	do.	3,556 r	4,111 r	4,419 r	4,211 r	4,200 e
Peat, fuel and agricultural		639	577	641	632	620
Petroleum:						
Crude[6]	thousand 42-gallon barrels	6,290 r	5,900 r	5,350	5,600 r	5,100
Refinery products[e, 7]	do.	119,000 r	137,000 r	134,000 r	144,000 r	150,000

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. do. Ditto. -- Zero.

[1]Table includes data available through November 30, 2010.

[2]In addition to the commodities listed, cobalt and nickel, which are associated with copper ores, are produced in quantities that so far have not warranted further recovery. Fuel briquets may be produced, however, available information is inadequate to make reliable estimates of output.

[3]Based on official Polish estimates.

[4]Copper smelter production is based on production at KGHM Polska Miedz S.A. Additional smelter production may have taken place at the Institute of Non-Ferrous Metals at Gliwice.

[5]Estimates based on reported platinum- and palladium-bearing final (residual) slimes and their average Pt and Pd content from electrolytic copper refining.

[6]Figures were converted to barrels from production in metric tons, which was reported as the following: 2005—847,844 t (revised); 2006—795,742 t (revised); 2007—720,603 t; 2008—754,907 t; and 2009—686,992 t.

[7]Figures were converted to barrels from production in metric tons, which was reported as the following: 2005—16,074,171 t; 2006—18,689,470 t; 2007—18,187,650 t; 2008—19,631,450 t; and 2009—20,499,407 t.

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TABLE 2
POLAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities	Annual capacity
Aluminum:			
Primary[2]	Aluminium Konin-Impexmetal S.A.	Konin	55.[e]
Secondary	NPA Skawina Ltd.	Skawina	NA.
Do.	Grupa KETY S.A.	Kety	NA.
Do.	Zaklady Metalurgiezne "Trzebinia"	Trzebinia	NA.
Do.	Nicromet	Bestwinka	18.
Do.	Alumetal S.A.	Kety	NA.
Do.	POLST Sp. z o.o.	Walbrzych	NA.
Barite[3]	Przedsiebiorstwo Hondlowo Uslugowe R&S Spolka z o.o.	Boguszow, Stanislawow deposits near Boguszow-Gorce	3.[e]
Cadmium, refined metric tons	Huta Cynku "Miasteczko Slaskie" S.A.	Miasteczko Slaskie	500.
Cement	Gorazdze Cement S.A. (Heidelberg Cement AG, 100%)	Chorula	2,800 clinker, 4,100 cement.[e]
Do.	Grupa Ozarow S.A. (CRH plc., 100%)	Plants at Ozarow and Rejowiec	2,800 clinker,[e] 3,250 cement.[e]
Do.	Cemex Polska Sp. z o.o.	Plants at Chelm and Rudniki	2,300 clinker,[e] 3,000 cement.[e]
Do.	Cementownia Warta S.A. (Polen Zement Beteiligungsgeselschaft GmbH)	Dzialoszyn	1,400 clinker,[e] 2,000 cement.[e]
Do.	Lafarge Cement S.A.	Plants at Malogoszcz and Piechcin	3,000 clinker,[e] 4,800 cement.
Do.	Dykerhoff Polska	Sitkowka-Nowiny	1,100 clinker,[e] 1,600 cement.
Do.	Cementownia "Nowa Huta" S.A. (Polska Energetyka Holdings S.A.)	Krakow	300 clinker,[e] 500 cement.[e]
Do.	Cementownia "Odra" S.A.	Opole	400 clinker,[e] 800 cement.[e]
Cement, aluminous	Gorka Cement Sp. z o.o.	Trzebinia	70 clinker,[e] 70 cement.[e]
Coal:			
Bituminous	Includes:	Of which:	90,000.[e, 4]
	100% Government owned:		
	Kompania Weglowa S.A. (KW)	Upper Silesia (16 mines)	
	Jastrzebska Spolka Weglowa S.A.	Upper Silesia (6 mines)	
	Katowicki Holding Weglowy S.A.	Upper Silesia (5 mines)	
	Poludniowy Koncern Weglowy S.A.	Upper Silesia (2 mines)	
	KWK Kazimierz-Juliusz Sp. z o. o.	Upper Silesia (1 mine)	
	Lubelski Wegiel Bogdanka S.A. (Government, 60.53%)	Bogdanka, east of Leczna, eastern Poland (1 mine)	
	SILTECH Sp. z o.o.	Upper Silesia (1 mine)	
Brown coal and lignite	Includes:	Of which:	75,000.[e, 4]
	PGE KWB Belchatow S.A. (PGE Polish Energy Group Plc.)	Belchatow, south of Lodz (1 mine)	
	PGE KWB Turow S.A. (PGE Polish Energy Group Plc.)	Bogatynia, at the southwest corner of Poland (1 mine)	
	KWB Konin S.A. (Government)	Konin (5 open pit mines)	
	KWB Adamow S.A. (Government)	Turek (4 open pit mines)	
	KWB Sieniawa Sp. z o.o.	Sieniawa (1 mine)	
Coke	Includes:	Of which:	10,200.[4]
	Zaklady Koksownicze Zdzieszowice (ArcelorMittal Poland S.A., 100%)	Upper Silesia (Zdzieszowice)	
	Zaklady Koksownicze Przyjazn Sp. z o.o.	Upper Silesia (Dabrowa Gornicze)	
	Kombinat Koksochemiczny Zabrze S.A.	Upper Silesia (Cokeries at Jadwiga, Radlin, and Debiensko)	
	ArcelorMittal Poland S.A.	Upper Silesia (Krakow)	
	ISD Huta Czestochowa Sp. z o.o.	Upper Silesia (Czestochowa)	
	Zaklady Koksownicze "Victoria" S.A.	Upper Silesia (Walbrzychu)	
	BO-CARBO Sp. z o.o.	Upper Silesia (Bytom)	

See footnotes at end of table.

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TABLE 2—Continued
POLAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities	Annual capacity
Copper:			
Ore, gross weight (averaged 1.64% Cu)	Kombinat Gorniczo Hutniczy Miedz Polska Miedz S.A. (KGHM) (Government, 41.79%)	Lubin Mine, Lubin-Glogow District	7,000.
Do.	do.	Polkowice-Sieroszowice Mine, Lubin-Glogow District	11,000.
Do.	do.	Rudna Mine, Lubin-Glogow District	12,000.
Concentrate, gross weight (averaged 22.8% Cu)	do.	Lubin beneficiation plant, Lubin-Glogow District	500.
Do.	do.	Polkowice beneficiation plant, Lubin-Glogow District	600.
Do.	do.	Rudna beneficiation plant, Lubin-Glogow District	1,050.
Metal, refined	do.	Refineries at Glogow I, Glogow II, and Legnica	540.
Feldspar	Strzeblowskie Kopalnie Surowcow Mineralnych	Mine at Sobotka, Lower Silesia, workings at Pagorki Zachodnie and Pagorki Wschodnie	500.
Do.	Pol-Skal Sp. z o.o.	Karpniki, southwestern region of Jelenia Gora	100.
Ferroalloys:			
Electric furnace (FeSiMn, FeMn, FeSi)	Huta Laziska S.A.	Upper Silesia at Laziska Gorne	120.[e]
Blast furnace (FeMn)	STALMAG Sp. z o.o.	Upper Silesia at Ruda Slaska	50.[e]
Gold, metal kilograms	Kombinat Gorniczo Hutniczy Miedz Polska Miedz S.A. (KGHM) (Government, 41.79%)	Refinery at Glogow	1,700.
Gypsum and anhydrite	Includes:	Of which:	1,400.[4]
	Zaklady Przemyslu Gipsowego "Dolina Nidy" S.A.	Southeastern Poland, Gacki	
	Rigips Polska Stawiany Sp. z o.o.	Southeastern Poland, Szarbkow	
	Kopalnia Gipsu i Anhydrytu "Nowy Lad"	Lower Silesia, mines at Niwnice and Iwiny	
Helium million cubic meters	Polskie Gornictwo Naftowe i Gazownictwo S.A. (PGNiG) (Government, 84.75%)	Western Poland, Odolanow	3.
Kaolin	KSM "Surmin-Kaolin" S.A.	Lower Silesia, Nowogrodziec	90, crude,[e]
Do.	Grudzen Las Sp. z o.o.	Grudzen Las, in Lodz Voivodeship	55, processed.[e]
Do.	Tomaszowskie Kopalnie Surowcow Mineralnych "Biala Gora" Sp. z o.o.	Smardzewice, Tomaszowski Voivodeship	30, processed.[e]
Lead-zinc:			
Mine output	Zaklady Gorniczo-Hutnicze (ZGH) "Boleslaw" S.A. (Government, 100%)	Mines and concentrators at Olkusz and Pomorzany, Bukowno region	30 lead, 110 zinc.[e]
Do.	Zaklady Gorniczo "Trzebionka" S.A.[5]	Mine and concentrator at Trzebinia	30 lead, 40 zinc.
Metal:			
Pb, refined	Huta Cynku Miasteczko Slaskie (HCM) S.A.	Refinery at Miasteczko Slaskie	35.
Do.	"Baterpol" Sp. z o.o. (Impexmetal S.A.)	Refinery at Katowice	30.
Do.	Kombinat Gorniczo Hutniczy Miedz Polska Miedz S.A. (KGHM) (Government, 41.79%)	Smelter at Legnica	35.
Do.	Orzel Bialy S.A.	Refinery at Bytom	40.
Zn, refined	Huta Cynku Miasteczko Slaskie (HCM) S.A.	Imperial smelter at Miasteczko Slaskie	85.
Do.	Zaklady Metalurgiczny Silesia S.A.	Refinery at Katowice	12.
Do.	Zaklady Gorniczo-Hutnicze (ZGH) "Boleslaw" S.A. (Government, 100%)	Refinery at Boleslaw	75.
Lime	Includes:	Of which:	2,200.[e, 4]
	Zaklady Przemyslu Wapienniczego (ZPW) Trzuskawica S.A. (CRH plc, 100%)	Plants in Sitkowka-Nowiny and Bielawy	
	Lhoist Group:		
	Lhoist Opolwap S.A.	Tarnow Opolski, Opole County	
	Lhoist Bukowa Sp. z o.o.	Kieleckie County, Swietokrzyskie Mountains	
	Zaklad Wapienniczy Wojcieszow Sp. z o.o.	Wojcieszow	
	Zaklady Wapiennicze Lhoist Sp. z o.o.	Gorazdze	
	GiGa Sp. z o.o.	Plaza	

See footnotes at end of table.

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TABLE 2—Continued
POLAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies	Location of main facilities	Annual capacity
Natural gas	million cubic meters	Polskie Gornictwo Naftowe i Gazownictwo S.A. (PGNiG) (Government, 72.94%)	Gasfields in southeastern Poland in the Carpathians, the Carpathian Foreland, and the Polish Lowlands regions	4,300.[e]
Do.	do.	LOTOS Petrobaltic S.A. (Grupa LOTOS S.A.)	Baltic Sea Shelf	30.[e]
Do.	do.	FX Energy, Inc.	Western Poland	70.[e]
Nitrogen:				
Ammonia (NH_3)		Includes:	Of which:	2,600.[e,4]
		Zaklady Azotowe "Pulawy" S.A.	Pulawy in eastern Poland	
		Zaklady Azotowe "Kedzierzyn" S.A.	Kedzierzyn in Upper Silesia	
		Zaklady Azotowe "Anwil Wloclawek" S.A.	Wloclawek in central Poland	
		Zaklady Azotowe S.A. w Tarnowie	Tarnow in southern Poland	
		Azoty-Adipol S.A. (former Chorzow plant)	Chorzow in Upper Silesia	
		Zaklady Chemiezne "Police"	Police in northwestern Poland	
Petroleum:				
Crude	thousand 42-gallon barrels	Polskie Gornictwo Naftowe i Gazownictwo S.A. (PGNiG) (Government, 72.94%)	Oilfields in southeastern and western Poland with about 75% of production from the Barnowko-Mostno-Buszewo field near Debno	4,000.[e]
Do.	do.	LOTOS Petrobaltic S.A. (Grupa LOTOS S.A.)	Baltic Sea Shelf	1,500.[e]
Do.	do.	FX Energy, Inc.	Western Poland	70.[e]
Refined	do.	Includes:	Of which:	165,000.[4]
		Petrochimia-Plock (PNK Orlen S.A.)	Plock in central Poland	
		Rafineria "Gdansk" (Grupa LOTOS S.A.)	Gdansk in northern Poland	
		Rafineria "Trzebinia" (PNK Orlen S.A.)	Trzebinia in southern Poland	
		Rafineria "Jedlicze" (PNK Orlen S.A.)	Jedlicze in southern Poland	
		Podkarpackie Zaklady Rafyneryjne w Jasle	Jaslo in southern Poland	
Rhenium (content of ammonium perrhenate)	kilograms	KGHM Ecoren S.A. [Kombinat Gorniczo Hutniczy Miedz Polska Miedz S.A. (KGHM) (Government, 41.79%)]	Lubin	3,500.
Salt:		Includes:	Of which:	5,000.[e,4]
Brine		Inowroclawskie Kopalnie Soli Solino S.A.	Mines at Gora and Mogilno in central Poland	
		Polskie Gornictwo Naftowe i Gazownictwo S.A. (PGNiG) (Government, 72.94%)	Mine at Mogilno in central Poland	
		Kopalnia Soli "Wieliczka" S.A.	Wieliczka in southern Poland, near Krakow, mining deposits at Barycz and Wieliczka	
Rock salt		Kopalnia Soli "Klodawa" S.A.	Klodawa in central Poland	
		Kombinat Gorniczo Hutniczy Miedz Polska Miedz S.A. (KGHM) (Government, 41.79%)	Sieroszowice in southwestern Poland	
Desalination of mine waste water		Zaklad Odsalania Wod Dolowych "Debiensko" Sp. z o.o.	Czerwionka-Leszczyny, west of Debiensko	
Selenium		Kombinat Gorniczo Hutniczy Miedz Polska Miedz S.A. (KGHM) (Government, 41.79%)	Refinery at Glogow	90.
Silver, refined	metric tons	do.	Precious metals plant at the Glogow smelter (refined silver produced from anode slime resulting from electrolytic processing of copper)	1,400.
Do.	do.	Institute of Non-ferrous Metals	Gliwice	30.[e]

See footnotes at end of table.

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TABLE 2—Continued
POLAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities	Annual capacity
Steel, crude	ArcelorMittal S.A., of which:		8,000.
	ArcelorMittal Poland S.A.	Steelworks at Dobrowa Gornicza (former Huta Katowice S.A.), producing pig iron, crude steel, hot-rolled products, and cast steel	
	do.	Steelworks at Krakow (former Huta Sendzimir S.A.), producing pig iron, crude steel, hot-rolled products, cold-rolled products, pipes, cast iron, tinplated sheets, and galvanized sheets	
	do.	Steelworks in Swietochlowice (former Huta Floriana S.A.), producing crude steel, hot-rolled products, galvanized sheet, and cold-rolled strip	
	ArcelorMittal Warszawa Sp. z o.o.	Steelworks in Warsaw (former Huta "Lucchini-Warszawa" Sp. z o.o.), producing crude steel, special steel, hot-rolled products, and cold-rolled strip	
Do.	CMC Zawiercie S.A. (Commercial Metals Co.)	Steelworks at Zawiercie, producing crude steel, hot-rolled products, cast iron, and cast steel	1,300.
Do.	ISD Huta Czestochowa S.A. (Industrial Union of Donbass Corp.	Steelworks at Czestochowa, producing crude steel, hot-rolled sheets, pipes, and cast iron	1,000.
Do.	Celsa Huta Ostrowiec S.A. (Celsa Group)	Steelworks at Ostrowiec-Swietokrzyski, producing crude steel, rods, hot-rolled products	1,100.[e]
Do.	Ferrostal Labedy Sp. z o.o. (Zlomrex S.A.)	Steelworks at Gliwice, producing crude steel, hot-rolled products, and bars	400.
Do.	Huta Stali Jakosciowych S.A. (Zlomrex S.A.)	Steelworks at Stalowa Wola, producing crude steel, hot-rolled products, cold-rolled sheets	256.
Do.	Huta Batory Sp. z o.o. (Alchemia S.A.)	Steelworks at Chorzow, producing crude steel, special steels, pipes, and tubes	150.[e]
Do.	Huta Zabrze S.A.	Steelworks at Zabrze, producing crude steel, cast iron, and cast steel	NA.
Sulfur	P.P. Kopalnie i Zaklady Chemiczne Siarki "Siarkopol"	Operations at Grzybow, mining the Osiek deposit	800.

[e]Estimated. Do., do. Ditto. NA Not available.
[1]The data presented in this table were compiled, in large measure, from information provided in the Minerals Yeabook of Poland (Bilans Gospodarki Surowcami Mineralnymi w Polsce Na Tle Gospodarki Swiatowej 2008) prepared and published by the Department of Mineral and Energy Policy, Mineral and Energy Economy Research Centre of the Academy of Science of Poland, The Ministry of Environmental Protection, Natural Resources, and Forestry. Additionally, very valuable information and criticism was provided by Mr. Krystof Galos and other members of his academic department at the Polish Department of Mineral and Energy Policy.
[2]Production of primary aluminum stopped in February 2009 owing to the high cost of electricity.
[3]The production of barite at the "Boguszow" barite mine was stopped in 1997 because of large-scale area flooding; production of barite since 1997 has been through the processing of old flotation tailings.
[4]Annual capacity listed is total for all deposits, mines, or companies that produce the commodity.
[5]Zaklady Gorniczo "Trzebionka" S.A. stopped production of lead-zinc ore in early 2009 owing to the exhaustion of reserves.

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The Mineral Industry of Portugal

By Alfredo C. Gurmendi

In 2009, Portugal was a significant world producer of lithium (5th after Chile, Australia, China, and Argentina), tin [11th after China, Indonesia, Peru, Bolivia, Brazil, Congo (Kinshasa), Vietnam, Australia, Malaysia, and Russia], and tungsten (6th after China, Russia, Canada, Australia, and Bolivia) (Carlin, 2010; Jaskula, 2010; Shedd, 2010).

Portugal's economy has become diversified and increasingly service based since the country joined the European Union (EU) in 1986. The country qualified for membership in the European Monetary Union (EMU) in 1998 and began circulating the euro on January 1, 2002, along with 11 other EMU members. In 2009, Portugal's gross domestic product (GDP) based on purchasing power parity was $255.4 billion. The sectors that contributed to the country's GDP were services (71.4%), industry (26.3%), and agriculture (2.3%). In 2009, Portugal's exports amounted to $43.4 billion compared with $55.8 billion in 2008, and included such products as machinery and tools (18.3%), crude oil products (16.7%), base metals (9.1%), minerals and mineral products (5.6%), chemical products (4.5%), and others (45.8%). Portugal's leading export partners were Spain (27.2%), Germany (12.9%), France (11.7%), Angola (6.0%), the United Kingdom (5.5%), Italy (3.8%), the United States (3.5%), and others (29.4%). The main export destination was the EU (27 members, 73.1%). Portugal's imports amounted to $69.8 billion compared with $90 billion in 2008 and included such products as machinery and tools (18.3%), crude oil products (16.7%), chemical products (9.7%), base metals (8.5%), minerals and mineral products (1.5%), and others (45.3%). Portugal's leading suppliers were Spain (30.8%), Germany (12.4%), France (8.3%), Italy (5.3%), Netherlands (4.6%), the United Kingdom (3.2%), and others (35.4%). The main import source was the EU (27 members, 75.9%) (Federation of International Trade Associations, The, 2010; U.S. Department of State, 2010; World Trade Organization, 2010).

Portugal's foreign direct investment (FDI) inflow was $46 billion in 2009. This flow went mainly to commerce (35%), petroleum processing (30%), the financial sector (21%), and transportation (14%). Portugal's economy, however, stagnated with 0% growth in 2008 and declined by 2.6% in 2009. Portugal's economy was expected to have a slow recovery of about 0.7% in 2010 and almost 1% of projected growth by 2011. In 2009, unemployment increased to 9.5% from 7.6% in 2008 (U.S. Central Intelligence Agency, 2010; U.S. Department of State, 2010).

Minerals in the National Economy

Portugal is a significant European minerals producer and remains one of the EU's leading copper and silver producers. Portugal is considered a major producer of industrial minerals, fuels, tin, tungsten, and zinc. Portuguese minerals are controlled by the Instituto Geologico e Mineiro. In Portugal, EuroZinc Mining Corp. (EuroZinc) of Canada is quite active in exploration and has several gold and base-metal exploration properties. One of the most promising projects is the Aljustrel zinc-lead-silver project, which is located in the Iberian Pyrite Belt (IPB) of south-central Portugal and is an area known to host numerous multimillion-metric-ton base-metal deposits. EuroZinc had an option to earn a 75% interest in the Aljustrel complex, which hosts five known volcanogenic massive sulfide (VMS) deposits, which are an important source of copper and zinc. Aljustrel's final feasibility study estimated total minable reserves to be 13.8 million metric tons (Mt) grading an average of 5.5% zinc, 1.8% lead, and 63 grams per metric ton (g/t) silver (MBendi Information Services (Pty) Ltd., 2010c, f).

Portugal's most valuable metallic mineral resources are copper, silver, tin, tungsten, and zinc. The most valuable resources of industrial minerals are high-quality lithium, marble, pyrites, and rock salt. The country has limited energy resources and depended upon imports for the bulk of its energy needs (International Energy Agency, 2009, p. 1, 4; Direcção Geral de Energia e Geologia, 2010; MBendi Information Services (Pty) Ltd., 2010c; U.S. Energy Information Administration, 2010b).

Portugal's mining and mineral processing industries represented about 1% of the GDP in 2009. The mineral sector employed about 31,400, or 0.6% of the labor force total of 5.6 million. As a target for FDI, Portugal was overshadowed by lower cost producers in Asia and Central Europe (Instituto Nacional de Estatística, 2010; U.S. Central Intelligence Agency, 2010).

Production

Portugal's industrial minerals sector was a modern and efficient producer of a variety of materials; the dimension stone and rock salt sectors particularly continued to be important segments of the mining industry in terms of value and trade. Portugal was one of the leading producers of mined copper, silver, tungsten, and zinc concentrates in the EU and an important producer of barite, lithium, and talc (table 1; Direcção Geral de Energia e Geologia, 2010).

Structure of the Mineral Industry

The merger of Canadian corporations Lundin Mining Corp. and EuroZinc was finalized on October 31, 2006. EuroZinc was quite active in exploration and the new Lundin Mining Corp. (Lundin Mining) became a part of the European copper, lead, and zinc industries. Lundin Mining was expecting to move quickly to take advantage of its mineral exploration and development prospects. In Portugal, Lundin Mining acquired the Aljustrel zinc-lead-silver mine, the Lombador copper-zinc project, and the Neves Corvo copper-zinc mine. Feasibility studies were underway for the development of the Lombador base-metals mine and the expansion of the Neves Corvo zinc mine, and the mining operations of both mines were expected

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to begin by 2012. Lundin Mining was set to conduct greenfield exploration for base and precious metals near the Neves Corvo Mine. Beralt Tin & Wolfram (Portugal) SARL (Beralt) mined tungsten at its Panasqueira Mine, which is located in Beira Baixa Province in the east-central region of Portugal (Lundin Mining Corp., 2010; MBendi Information Services (Pty) Ltd., 2010b).

Lusosider Aços Planos S.A. and SN Servicos S.A. were the major steel producers. Cimentos de Portugal, SGPS, S.A. (CIMPOR) was an important producer of cement. With the exception of copper, dimension stone, and tungsten, production of other minerals and related materials had only domestic significance. Some of the leading mineral-related companies were partially owned or controlled by the Government, and some operations were privately owned. In 2009, Portugal had only two metallic mines in operation—the Neves Corvo copper mine and the Panasqueira tungsten mine (table 2; MBendi Information Services (Pty) Ltd., 2010b).

Commodity Review

Metals

Copper and Zinc.—Production from the Neves Corvo Mine (NCM) was 86,500 metric tons (t) in concentrate in 2009 compared with 89,504 t in 2008, which was a decrease of 3.4%. NCM's current production capacity was about 2.2 million metric tons per year (Mt/yr) of mine ore output and 100,000 metric tons per year (t/yr) of copper concentrate. The NCM produced 501 t of zinc in 2009 compared with 39,224 t in 2008 (table 1; Direcção Geral de Energia e Geologia, 2010).

Zinc production was curtailed in 2009 and a target production for 2010 was set at 6,000 t, dependent on the zinc price. According to NCM's owner Lundin Mining, as of December 31, 2009, the NCM's copper-rich ores amounted to 20.5 Mt grading 3.7% copper, 0.9% zinc, 0.3% lead, and 44 g/t silver, and zinc-rich ores amounted to 54.2 Mt grading 6.7% zinc, 0.4% copper,1.6% lead, and 59 g/t silver (Instituto Nacional de Estatística, 2010; Lundin Mining Corp., 2010; MBendi Information Services (Pty) Ltd., 2010b; Resource Investor, 2010).

Tungsten.—Production from the Panasqueira tungsten mine was 823 t in concentrate (W content) in 2009 compared with 982 t in 2008, which was a decrease of almost 16.2%. The Panasqueira Mine is operated by Beralt and continued to be one of the EU's leading producers of tungsten concentrates with a capacity to produce 1,400 t/yr of tungsten oxide (WO_3) concentrate. According to Beralt, the mine has proven and probable reserves of 1.4 Mt at a grade of 0.233% WO_3 and additional indicated resources of 3.3 Mt at a grade of 0.263% WO_3 and inferred resources of 1.6 Mt at a grade of 0.224% WO_3. The main end-use application for tungsten was in the manufacture of cemented carbides (60%), steel and alloy (21%), electrical and electronics (11%), and catalysts and pigments (8%) (Direcção Geral de Energia e Geologia, 2010; MBendi Information Services (Pty) Ltd., 2010a, e).

Industrial Minerals

Cement.—Portugal produced 6.9 Mt of cement in 2009 compared with almost 6.7 Mt in 2008 (revised). CIMPOR was Portugal's leading cement producer and the second ranked cement company on the Iberian Peninsula after Cemex España S.A. In addition to cement, CIMPOR also produced aggregates, dry mortars, and precast concrete products. The development of Portugal's infrastructure was expected to create a substantial demand for CIMPOR's products in the foreseeable future (Cemex España S.A., 2010; Cimentos de Portugal, SGPS, S.A., 2010a-d).

Salt.—Rock salt was the most valuable of the industrial minerals produced in Portugal. Production of rock salt totaled 576,723 t in 2009 compared with 606,545 t in 2008 (Direcção Geral de Energia e Geologia, 2010).

Mineral Fuels

Petroleum, Natural Gas, and Coal.—In 2009, Portugal continued to rely on imported energy resources, such as petroleum (70%), natural gas (10%), and coal (5%) for electricity generation. The country's leading domestic energy resource was hydropower, which is an unreliable source of power because it depends on rainfall. Portugal has two crude oil refineries, located in the coastal cities of Sines and Porto. The Government-owned Petróleos de Portugal (Petrogal) operates both refineries, which have a combined capacity of 304,174 barrels per day (bbl/d). The Government was planning to invest about $2 billion to upgrade the country's refining processes by 2011. Owing to Portugal's heavy dependence on imported energy, the country was emphasizing solar, wave, and wind power investment. The Government was planning to invest about $11 billion in renewable energy projects by 2012, of which $2.5 billion would be for building the infrastructure for wind power. Argus Resources Ltd. of the United Kingdom built a petroleum refinery located 90 kilometers south of Lisbon at Sines; the refinery had a production capacity of 250,000 bbl d and cost about $5 billion to build. The political and legal issues of the EU-Russia energy relationship has been rewritten in many ways owing to the 2009 disruption of gas supply to the EU by way of Ukraine, which raised questions concerning the reliability of the energy supply from Russia. Production data for mineral fuels and refined products are shown in table 1 and are based on data collected by the U.S. Energy Information Administration (Oil & Gas Observer, 2009; MBendi Information Services (Pty) Ltd., 2010d; U.S. Energy Information Administration, 2010a).

Outlook

Portugal is the EU's leading producer of copper, rock salt, silver, and tungsten. Gold and other base-metal projects were undergoing feasibility studies in the Portuguese zone of the IPB, which continued to be a prime target for exploration. The IPB appears to have good potential for new mineral discoveries on the basis of the large VMS deposits developed in the past. The Portuguese Government is considering increasing investments

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in energy alternative sources, such as hydropower, solar, wave, wind, and other renewable energy sources to make the country less dependent on imported energy (Alexander's Gas & Oil Connections, 2010; MBendi Information Services (Pty) Ltd., 2010d).

References Cited

Alexander's Gas & Oil Connections, 2010, Portugal plans EUR 8.1 bn investment in renewable energy by 2012: Alexander's Gas & Oil Connections. (Accessed September 15, 2010, at http://www.gasandoil.com/goc/news/nte71728.htm.)

Carlin, J.F., Jr., 2010, Tin: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 170-171.

Cemex España S.A., 2010, Cemento—España: Cemex España S.A. (Accessed September 15, 2010, at http://www.cemex.es/ne/ne_lp.html.)

Cimentos de Portugal, SGPS, S.A., 2010a, CIMPOR—2009 sustainability report: Cimentos de Portugal, SGPS, S.A., 166 p. (Accessed September 14, 2010, at http://www.cimpor.pt/cache/bin/XPQej8wXX5978ZAX6gkNRyMZKU.pdf.)

Cimentos de Portugal, SGPS, S.A., 2010b, CIMPOR—Annual report and accounts, 2009 financial year: Cimentos de Portugal, SGPS, S.A., 296 p. (Accessed September 14, 2010, at http://www.cimpor.pt/cache/bin/XPQej8wXX4931ZAX6gkNRyMZKU.pdf.)

Cimentos de Portugal, SGPS, S.A., 2010c, CIMPOR—Cimentos e cal hidráulica: Cimentos de Portugal, SGPS, S.A. (Accessed September 14, 2010, at http://www.cimpor.com/.)

Cimentos de Portugal, SGPS, S.A., 2010d, CIMPOR—Portugal: Cimentos de Portugal, SGPS, S.A. (Accessed September 14, 2010, at http://www.cimpor.com/artigo.aspx?cntx=vdxUbnvw%2FMcerjeeTqgT3YiXv7qfGTh6lidX4Og6%2BGoM6mPr0AskD1yD%2Fyxu4osj.)

Direcção Geral de Energia e Geologia, 2010, Divisão para a Pesquisa e Exploração de Petróleo: Direcção Geral de Energia e Geologia. (Accessed September 11, 2010, at http://www.dgge.pt/default.aspx.)

Federation of International Trade Associations, The, 2010, Portugal information: The Federation of International Trade Associations. (Accessed August 12, 2010, at http://fita.org/countries/portugal.html?ma_rubrique_economie.)

Instituto Nacional de Estatística, 2010, Statistics Portugal: Instituto Nacional de Estatística. (Accessed September 18, 2010, at http://www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine_cont_inst&ine_smenu.boui=13918463&INST=53884.)

International Energy Agency, 2009, Energy policies of IEA countries—Portugal, executive summary: International Energy Agency, 4 p. (Accessed September 12, 2010, at http://www.iea.org/Textbase/npsum/portugal2009SUM.pdf.)

Jaskula, B.W., 2010, Lithium: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 92-93.

Lundin Mining Corp., 2010, Neves Corvo Mine—Portugal: Lundin Mining Corp. (Accessed September 12, 2010, at http://www.lundinmining.com/s/Neves-Corvo.asp.)

MBendi Information Services (Pty) Ltd., 2010a, Beralt Tin & Wolfram (Portugal) SARL—Portugal: MBendi Information Services (Pty) Ltd. (Accessed September 14, 2010, at http://www.mbendi.com/orgs/cnzg.htm.)

MBendi Information Services (Pty) Ltd., 2010b, Copper mining in Portugal—Overview: MBendi Information Services (Pty) Ltd. (Accessed September 11, 2010, at http://www.mbendi.com/indy/ming/cppr/eu/po/p0005.htm.)

MBendi Information Services (Pty) Ltd., 2010c, Mining in Portugal—Overview: MBendi Information Services (Pty) Ltd. (Accessed September 11, 2010, at http://www.mbendi.com/indy/ming/eu/po/p0005.htm.)

MBendi Information Services (Pty) Ltd., 2010d, Oil and gas in Portugal—Exploration & production: MBendi Information Services (Pty) Ltd. (Accessed January 6, 2010, at http://www.mbendi.com/indy/oilg/eu/po/p0005.htm.)

MBendi Information Services (Pty) Ltd., 2010e, Panasqueira—Tungsten mine in Portugal: MBendi Information Services (Pty) Ltd. (Accessed September 14, 2010, at http://www.mbendi.com/facility/fl5e.htm.)

MBendi Information Services (Pty) Ltd., 2010f, Zinc and lead mining in Portugal—Overview: MBendi Information Services (Pty) Ltd. (Accessed September 11, 2010, at http://www.mbendi.com/indy/ming/ldzc/eu/po/p0005.htm.)

Oil & Gas Observer, 2010, EU—Russia energy relations, legal, and political issues: Oil & Gas Observer. (Accessed September 15, 2010, at http://www.oilandgasobserver.com/reports/eu_russia_energy_relations.asp.)

Resource Investor, 2010, Lundin's higher zinc reserve estimates at Neves-Corvo Mine: Resource Investor. (Accessed January 6, 2010, at http://www.resourceinvestor.com/News/2008/3/Pages/Lundin-s-Higher-Zinc-Reserve-Estimates-at.aspx.)

Shedd, K.B., 2010, Tungsten: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 176-177.

U.S. Central Intelligence Agency, 2010, Portugal, *in* The world factbook: U.S. Central Intelligence Agency, August 18. (Accessed September 12, 2010, at https://www.cia.gov/library/publications/the-world-factbook/geos/po.html.)

U.S. Department of State, 2010, Portugal, 2010: U.S. Department of State background note, February 24. (Accessed September 2, 2010, at http://www.state.gov/r/pa/ei/bgn/3208.htm.)

U.S. Energy Information Administration, 2010a, International energy statistics, Europe— Portugal: U.S. Energy Information Administration. (Accessed October 18, 2010, at http://tonto.eia.doe.gov/cfapps/ipdbproject/iedindex3.cfm?tid=5&pid=53&aid=1&cid=r3,&syid=2005&eyid=2009&unit=TBPD.)

U.S. Energy Information Administration, 2010b, Portugal energy profile: U.S. Energy Information Administration, August 1. (Accessed September 2, 2010, at http://www.eia.doe.gov/country/country_energy_data.cfm?fips=PO.)

World Trade Organization, 2010, Trade profiles, Portugal: World Trade Organization 2010. 198 p. (Accessed October 18, 2010, at http://www.wto.org/english/res_e/booksp_e/anrep_e/trade_profiles 10_e.pdf.)

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TABLE 1

PORTUGAL: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008	2009[p]
METALS						
Aluminum, secondary[e]	thousand metric tons	18	18	18	18	18
Arsenic, white[e]		15	15	15	15	15
Beryl, concentrate, gross weight[e]		5	5	5	5	5
Copper, mine output, Cu content		89,541	78,660	90,247	89,504 r	86,500 2
Iron and steel:						
Iron ore and concentrate, manganiferous:[e]						
Gross weight		14,000	14,000	14,000	14,000	14,000
Fe content		10,000	10,000	10,000	10,000	10,000
Metal:[e]						
Pig iron	thousand metric tons	100	100	100	100	100
Steel:						
Crude	do.	1,400 2	1,400	1,400	1,400	1,400
Hot rolled	do.	800	800	800	800	800
Lead, refined, secondary[e]		3,000	3,000	3,000	3,000	3,000
Manganese, Mn content of iron ore[e]		300	300	300	300	300
Silver, mine output, Ag content	kilograms	23,786	20,076	24,167	28,800 r	22,450 2
Tin, mine output, Sn content		243	25	41	29	34 2
Tungsten mine output, W content		816	984	846	982 r	823 2
Zinc:						
Mine output, Zn content		NA	7,505	24,380	39,224 r	501 2
Metal, primary[e]		2,000	--	--	--	--
INDUSTRIAL MINERALS						
Barite		21	24	25	171 r	1,078 2
Calcium carbonate[e]		100,000	100,000	100,000	100,000	100,000
Cement, hydraulic	thousand metric tons	8,438	8,340	12,631	6,650 r	6,900 3
Clays:						
Kaolin[4]		164,072	167,792	183,598	231,346 r	270,450
Refractory		395,820	307,512	320,253	NA	NA
Feldspar		133,344	257,570	168,606	157,539 r	NA
Gypsum and anhydrite		389,180	366,590	418,035	372,731 r	NA
Lime, hydrated and quicklime[e]		200,000	200,000	200,000	200,000	200,000
Lithium minerals, lepidolite		26,185	28,497	34,755	34,888 r	38,500 e
Nitrogen, N content of ammonia[e]		244,000	244,000	244,000	244,000	244,000
Pyrite and pyrrhotite, including cuprous, gross weight[e]		8,000	8,000	8,000	8,000	8,000
Salt, rock		597,945	586,190	590,588	606,545 r	576,723 2
Sand	thousand metric tons	7,336	8,757	9,849	NA	NA
Sodium compounds, n.e.s.:[e, 5]						
Soda ash		150,000	150,000	150,000	150,000	150,000
Sulfate		50,000	50,000	50,000	50,000	50,000
Stone:						
Basalt		464,236	384,138	398,767	NA	NA
Calcareous:						
Dolomite	thousand metric tons	1,021	1,136	1,035	NA	NA
Limestone, marl, calcite	do.	51,025	48,015	48,955	NA	NA
Marble	do.	752	837	741	578 r	NA
Gabbro[e]	do.	100	100	100	100	100
Granite:						
Crushed	do.	30,000 e	26,779	NA	NA	NA
Ornamental	do.	659	710	1,020	877 r	NA
Graywacke	do.	344	253	189	NA	NA
Ophite	do.	51	43	42	NA	NA
Quartz	do.	5	5	7	9 r	NA
Quartzite	do.	256	197	78	NA	NA

See footnotes at end of table.

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TABLE 1—Continued

PORTUGAL: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008	2009[p]
INDUSTRIAL MINERALS—Continued						
Stone—Continued:						
Schist	thousand metric tons	208	156	820	NA	NA
Slate	do.	33	35	38	38 [r]	NA
Syenite	do.	109	159	131	NA	NA
Sulfur, byproduct, all sources[e]		25,000	25,000	25,000	25,000	25,000
Talc		5,362	5,517	12,367	11,220 [r]	11,567
MINERAL FUELS AND RELATED MATERIALS						
Coke, metallurgical[e]	thousand metric tons	300	300	300	300	300
Gas, manufactured[e]	thousand cubic meters	125	125	125	125	125
Petroleum production[6]	thousand 42-gallon barrels	1,471	1,822	2,321	2,730	1,728
Petroleum refinery products:[e]						
Liquefied petroleum gas	do.	4,444 [r]	4,616 [r]	4,176 [r]	4,444 [r]	4,450
Gasoline	do.	20,922 [r]	23,036 [r]	21,683 [r]	17,805 [r]	18,000
Kerosene and jet fuel	do.	6,516 [r]	-- [r]	6,516 [r]	6,508 [r]	6,500
Distillate fuel oil	do.	37,621 [r]	37,710 [r]	35,396 [r]	34,846 [r]	35,000
Residual fuel oil	do.	20,634 [r]	22,234 [r]	19,834 [r]	19,099 [r]	19,000
Unspecified	do.	16,973 [r]	15,599 [r]	15,323 [r]	15,709 [r]	16,000
Refinery fuel and losses	do.	3,800 [r]	3,800 [r]	3,800 [r]	3,800 [r]	3,800
Total	do.	110,910 [r]	106,995 [r]	106,728 [r]	102,211 [r]	102,750

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [p]Preliminary. [r]Revised. do. Ditto.

NA Not available. -- Zero.

[1]Table includes data available through January 30, 2010.

[2]Reported figure.

[3]Reported by Cimentos de Portugal, SGPS, S.A. (CIMPOR)

[4]Includes washed and unwashed kaolin.

[5]Not elsewhere specified.

[6]Reported figure. Source: U.S. Energy Information Administration 2005-09.

Source: USGS Minerals Questionnaires, Portugal, 2007-08 and 2008-09.

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TABLE 2
PORTUGAL: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Calcium carbonate		Omya Mineral Portuguesa Lda. (Salmon & Cia Lda.)	Mine and plant at Fatima	100
Cement		Cimentos de Portugal, SGPS, S.A. (CIMPOR) (Government, 100%)	Plants (3) at Alhandra, Loule, and Souselas	12,000
Copper, concentrate		Lundin Mining Corp.	Neves Corvo Mine near Castro Verde	100
Do.		do.	Aljustrel Mine near Castro Verde	20
Diatomite		Sociedade Anglo-Portugesa de Diatomite Lda.	Mines at Obidos and Rolica	150
Feldspar		A.J. da Fonseca Lda.	Seixigal Quarry, Chaves	10
Ferroalloys		Electrometalúrgia S.A.R.L.	Plant at Setubal	100
Kaolin		Saibrais Arelas e Caulinos S.A. (Denain Anzin Mineraux S.A.)	Mines at Casal dos Bracais and Mosteiros	175
Petroleum, refined	42-gallon barrels per day	Petróleos de Portugal (Petrogal) (Government, 100%)	Refineries at Porto and Sines	305,000
Do.	do.	Argus Resources Ltd. (private, 100%)	Refinery at Sines	250,000
Pyrite		Pirites Alentejanas S.A. (EuroZinc Mining Corp.)	Mine at Aljustrel, plant at Setubal	100
Steel, crude		SN Servicos S.A. (Metalúrgica Galaica S.A., 100%)	Steelworks at Maia and Seixal	600
Do.		Lusosider Aços Planos S.A. (Corus Group, 50%, and Sollac S.A., 50%)	Rolling mill at Seixal	800
Tin		Primary Metals Corp.	Neves Corvo Mine near Castro Verde	15
Tungsten, concentrate	metric tons	Beralt Tin & Wolfram (Portugal) SARL (Beralt)	Panasqueira Mine and plant at Barroca	1,400
Uranium	do.	Empresa Nacional de Uranio S.A. (Government, 100%)	Mines at Guargia, plant at Urgeirica	150
Zinc, concentrate	do.	Lundin Mining Corp.	Neves Corvo Mine near Castro Verde	25,000
Do.	do.	do.	Aljustrel Mine near Castro Verde	20
Zinc, refined	do.	RMC Quimigal S.A.R.L.	Electrolytic plant at Barreiro	12

Do., do. Ditto.

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The Mineral Industry of Romania

By Mark Brininstool

Romania's mineral production was not significant in terms of world production, and the industry was dependent on imports of mineral ores and concentrates to produce refined metals. European Union (EU) membership was achieved on January 1, 2007, which prompted the cessation or steep decline of metallic ore mining activities for copper, iron ore, lead, and zinc and the necessity for some production facilities either to modernize to meet EU standards or to close. Membership in the EU could increase the Romanian mineral industry's access to European markets and create trade opportunities, which could encourage greater production of processed goods if modernization of existing production facilities and investment in new facilities are undertaken.

Minerals in the National Economy

In 2009, Romania's gross domestic product (GDP) decreased by 7.1% in real terms compared with the GDP in 2008. Industrial production made up about 24% of the nominal GDP at current prices, but it was not reported what percentage of this amount was from mining and quarrying and metal production activities. Mining and quarrying activities employed about 73,000 people; the manufacture of basic metals employed about 40,000 people (National Institute of Statistics, 2010, p. 1, 100-101, 138).

Production

Production of most mineral commodities decreased significantly owing to the world economic crisis and the resulting reduction in demand for mineral commodities. Zinc metal production decreased by about 94%; manganese, by 70%; lead metal, by 69%; crude steel, by 46%; pig iron, by 45%; and aluminum, by 24%. Production of most industrial minerals was estimated to have declined significantly. Uranium mine production was added to table 1 based on production numbers published by the World Nuclear Association. The addition of uranium production does not indicate new mining, and in previous years the lack of production figures was owing to a reporting error by the U.S. Geological Survey (USGS).

Structure of the Mineral Industry

Table 2 is a list of major mineral industry facilities.

Commodity Review

Metals

Bauxite and Alumina and Aluminum.—In October, alumina production was restarted at Alum S.A. in Tulcea; the plant had been closed for modernization in 2007. Although no status update was available, it was assumed that the Cemtrade alumina plant at Oradea was still shut down. It originally stopped production in late 2006. In the beginning of 2009, Alro S.A. (Romania's only primary aluminum producer) closed one potline and reduced production by about 24% owing to the world economic crisis and the associated reduction in demand for aluminum products. It was unknown when the potline would be restarted (Central European Aluminum Co., 2009; Vimetco N.V., 2010, p. 5, 6).

Gold.—Gabriel Resources Ltd. of Canada continued to try to win approval for its proposed Rosia Montana gold project in northwestern Romania. Development of the project was put on hold when the technical review of the company's environmental impact assessment (EIA) by the Ministry of Environment was suspended in September 2007. Development of the mine could not be completed without the EIA, and the review remained suspended throughout 2009. Gabriel Resources reported proven reserves of 5.9 million troy ounces (Moz) [184 metric tons (t)] of gold and 32.6 Moz (1,014 t) of silver and probable reserves of 4.2 Moz (131 t) of gold and 15 Moz (467 t) of silver. The company estimated that the project could produce an average of 511,000 troy ounces per year of gold during a 16-year mine life and make Romania a significant European gold producer (Gabriel Resources Ltd., 2009; 2010, p. 2; Gossage and others, 2009, p. 3).

Lead and Zinc.—Sometra S.A. was Romania's only primary producer of lead and zinc metal. In January, the company suspended production owing to reduced demand for its products and to difficulty in obtaining lead and zinc concentrates (Mytilineos Holdings S.A., 2010, p. 16).

Industrial Minerals

Cement.—Although cement production decreased significantly, reported cement production capacity increased by 2.8 Mt/yr to 16.9 Mt/yr owing to investments made in existing plants. Holcim (Romania) S.A. increased the capacity of its plants by 1 Mt/yr, Carpatcement Holding S.A. increased the capacity at its plant at Bicaz by 1.4 Mt/yr, and Lafarge Ciment S.A. increased the capacity at its plants by 0.4 Mt/yr (HeidelbergCement AG, 2010, p. 67; Holcim Ltd., 2010, p. 187; Lafarge S.A., 2010, p. 30).

Outlook

Romania's mineral commodity production was negatively affected by the world economic crisis, and increased production will most likely depend on the improvement of the European economy. Production of metals was expected to continue, even though producers are likely to be under pressure to modernize facilities to meet EU standards. Foreign investors could be attracted to investing in the mineral industry owing to Romania's access to the EU markets.

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References Cited

Central European Aluminum Co., 2009, Cemtrade Oradea: Podgorica, Montenegro, Central European Aluminum Co. (Accessed October 20, 2010, at http://www.ceacgroup.com/index1.php?module=1&sub=3.)

Gabriel Resources Ltd., 2009, Gabriel provides clarification on Bucharest court of appeal ruling in environmental impact assessment case: Gabriel Resources Ltd., July 6. (Accessed August 19, 2010, at http://www.gabrielresources.com/news.htm.)

Gabriel Resources Ltd., 2010, 2008 annual report: Toronto, Ontario, Canada, Gabriel Resources Ltd., 4 p.

Gossage, B.L., Corser, P.G., Marek, J.M., Smith, Stuart, and Lattanzi, C.R., 2009, Technical report on the Rosia Montana gold project, Transylvania, Romania: Toronto, Ontario, Canada, Gabriel Resources Ltd., March 4, 197 p.

HeidelbergCement AG, 2010, Annual report 2009: Heidelberg, Germany, HeidelbergCement AG, May, 160 p.

Holcim Ltd., 2010, Annual report 2009: Zurich, Switzerland, Holcim Ltd., April, 202 p.

Lafarge S.A., 2010, 2009 annual report: Paris, France, Lafarge S.A., March, 263 p.

Mytilineos Holdings S.A., 2010, Annual financial report for the period from the 1st of January to the 31st of December 2009: Maroussi, Greece, Mytilineos Holdings S.A., April 27, 134 p.

National Institute of Statistics, 2010, Monthly statistical bulletin January 2010: Bucharest, Romania, National Institute of Statistics, January, 208 p.

Vimetco N.V., 2010, Annual report 2009: Amsterdam, Netherlands, Vimetco N.V., April 26, 140 p.

TABLE 1

ROMANIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007	2008	2009
METALS						
Alumina, calcined, gross weight		688,829	622,083	23,097	--	44,000
Aluminum:						
Primary		239,000	255,800	262,505	264,752	201,000
Secondary		7,109	10,524	11,674	12,149 r	10,544
Total		246,109	266,324	274,179	276,901 r	211,544
Copper:						
Mine output, Cu content of concentrate		15,000	12,132	2,213	2,000 r,e	1,000 e
Metal, refined:						
Primary		18,739	18,600	15,589	12,000	15,000
Secondary e		2,000	3,000	3,000	3,000	3,000
Total e		20,700	21,600	18,600	15,000	18,000
Gold, mine output, Au content e	kilograms	400	400	400	400	400
Iron and steel:						
Iron ore:						
Gross weight	thousand metric tons	265	123	45 e	-- e	--
Metal content	do.	69	40	11	--	--
Metal:						
Pig iron	do.	4,098	3,946	3,923	2,945 r	1,611
Ferroalloys, electric furnace:						
Ferrochromium e		--	--	--	6,000	15,000
Ferromanganese e		18,625 3	3,329 3	--	--	--
Silicomanganese		100,957	53,085	26,868	10,000 e	-- e
Total		119,582	56,414	26,868	16,000	15,000
Steel, crude	thousand metric tons	6,280	6,266	6,261	5,035 r	2,699
Finished products:						
Pipes and tubes e	do.	529 3	580 3	620	850 r	450
Rolled products	do.	5,196	5,696	5,589	4,500 e	2,800 e
Lead:						
Mine output, Pb content of concentrate		11,610	6,269	800 r	--	--
Smelter, primary e		12,000	7,000	800	--	--
Refined:						
Primary		32,903	29,130	34,368	34,000	9,000
Secondary e		5,000	5,000	5,000	5,000	3,000
Total e		37,900 r	34,100 r	39,400 r	39,000	12,000
Manganese, Mn content of ore e						
Gross weight e	thousand metric tons	65	65	55	50	15
Mn content	do.	14 3	13 3	11	10	3
Silver, mine output, Ag content e		15	18	18	18	18
Zinc:						
Mine output, Zn content of concentrate		13,784	8,052	1,000	--	--
Metal, refined, primary and secondary		57,000	44,000 r	58,000	62,000 r,e	4,000 e

See footnotes at end of table.

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TABLE 1—Continued

ROMANIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007	2008	2009
INDUSTRIAL MINERALS						
Cement, hydraulic[e]	thousand metric tons	7,032 [3]	8,253 [r,3]	10,000	11,000	7,800
Clays:						
Bentonite, marketable		20,226	21,165	16,911	16,643 [r]	13,756
Kaolin, marketable		20,266	11,063	7,576	3,166 [r]	1,000 [e]
Diatomite[e]		1,017 [3]	1,719 [3]	2,000	--	--
Feldspar[e]		74,920 [3]	33,100 [3]	45,000	25,000	14,000
Fluorspar[e]		15,000	15,000	15,000	15,000	15,000
Graphite		478	--	--	-- [e]	20,000 [e]
Gypsum	thousand metric tons	502	615	707	885 [r]	600 [e]
Lime[e]	do.	1,791 [3]	1,942 [3]	2,000	2,000	1,600
Nitrogen, N content of ammonia[e]	do.	1,300	1,300	1,300	1,300	1,100
Salt:						
Rock	do.	46	47	51	50 [e]	40 [e]
Other	do.	2,374	2,574	2,424	2,400 [e]	2,000 [e]
Total	do.	2,420	2,621	2,475	2,450 [e]	2,040 [e]
Sand and gravel[e]	do.	2,421 [3]	2,421 [3]	5,000	5,000	3,000
Sodium compounds:						
Caustic soda[e]	do.	443 [3]	477 [3]	475	650	300
Soda ash, manufactured, 100% Na_2CO_2 basis	do.	346	453	453	450 [e]	400 [e]
Sulfur, byproduct, all sources[e]	do.	200	--	--	--	-- [e]
Sulfuric acid[e]		11,000 [3]	500 [r]	-- [3]	--	500
Talc[e]		10,000	2,967 [3]	1,513 [3]	1,700	500
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Anthracite and bituminous	thousand metric tons	-- [r]	-- [r]	-- [r]	-- [r]	--
Brown and lignite[e]	do.	28,500 [r]	35,000 [r]	32,500 [r]	35,000 [r]	30,000
Coke, metallurgical	do.	1,777	1,790	1,558 [r]	1,080	320
Gas, natural, gross:						
Associated[e]	million cubic meters	1,220 [3]	1,088 [3]	1,100 [r]	1,000 [r]	1,000
Nonassociated[e]	do.	11,252 [3]	10,854 [3]	11,100 [r]	10,400 [r]	9,860
Total	do.	12,472	11,942	12,245 [r,3]	11,400 [e,r]	10,859 [3]
Petroleum:[e]						
Crude[4]	thousand 42-gallon barrels	39,100	37,800 [r]	38,200 [r]	36,000 [r]	33,700
Refinery products[5]	do.	111,000	113,000 [r]	109,000	112,000	97,300
Uranium, U_3O_8 content[e]		106	106	91	91	88

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. do. Ditto. -- Zero.

[1]Table includes data available through November 2, 2010.

[2]In addition to the commodities listed, a variety of construction materials are produced; antimony, asbestos, bismuth, and pyrites may have been produced; molybdenum may have been produced as a byproduct of copper from 1988 on; however, available information is inadequate to mke reliable estimates of output.

[3]Reported figure.

[4]Figures converted to barrels from production in metric tons, which was reported as the following: 2005—5,212,000; 2006—5,030,000 (revised); 2007—5,086,000 (revised); 2008—4,798,000 (revised); and 2009—4,494,000.

[5]Figures converted to barrels from production in metric tons, which was reported as the following: 2005—13,890,000; 2006—14,096,000 (revised); 2007—13,648,000; 2008—13,974,000; and 2009—12,165,000.

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TABLE 2
ROMANIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Alumina	Cemtrade (part of CEAC Group)	Plant at Oradea, near Hungarian border	250 [1]
Do.	Alum S.A. (99.4%, Vimetco NV)	Plant at Tulcea, Danube Delta	600
Aluminum:			
Primary	Alro S.A. (Vimetco NV, 88%)	Slatina, 120 kilometers west of Bucharest	265
Secondary	Neferal S.A. (member of Metanef Group)	Bucharest	NA
Cement	Holcim (Romania) S.A. (Holcim, 100%)	Plants at Alesd, Campulung, and Turda	5,700
Do.	Carpatcement Holding S.A. (HeidelbergCement AG, 99%)	Plant at Bicaz, northeastern Romania	3,000
Do.	do.	Plant at Fieni, 90 kilometers northwest of Bucharest	1,650
Do.	do.	Plant at Deva, western Romania	1,650
Do.	Lafarge Ciment S.A. (Lafarge S.A., 99%)	Plants at Hoghiz and Medgidia	4,900
Coal:			
Bituminous	Compania Nationala a Huilei-Petrosani (Government)	7 mines located near Petrosani	3,500 e
Lignite	Societatea National a Lignitului Oltenia (Government)	Tismana I-II, Garla-Rovinari Est, and Pinoasa opencast mines at Rovinari	8,000 e
Do.	do.	Rosia, Pesteana Nord, and Pesteana Sud-Urdari opencast mines at Balteni	6,900 e
Do.	do.	Udari underground mine at Udari	300 e
Do.	do.	Jilt Sud and Jilt Nord opencast mines at Matasari	7,000 e
Do.	do.	Dragotesti underground mine at Matasari	600 e
Do.	do.	Lupoaia and Rosiuta opencast mines at Motru	5,000 e
Do.	do.	Plostina, Horasti, and Lupoaia underground mines at Motru	1,600 e
Do.	do.	Seciuri, Oltet, Berbesti-Vest, and Panga opencast mines near Berbesti	2,000 e
Do.	do.	Albeni underground mine at Bolbocesti	555 e
Do.	do.	Husnicioara-Vest opencast mine near Drobeta Turnu Severin	2,500 e
Do.	do.	Zegujani underground mine about 18 kilometers northeast of Drobeta Turnu Severin	600 e
Do.	Societatea National a Carbunelui Ploiesti (Government)	8 mines located near Campulung, Baraolt City, Sarmasag, Popesti Commune, Comanesti Commune, Filipestii de Padure Commune, Sotanga Commune, and Borsec City	3,000 e
Do.	SC Complexul Energetic Craiova SA (Ministry of Economy, 73%)	Prigaria Mine	1,000 e
Coke	ArcelorMittal Galati (ArcelorMittal, 100%)	Galati, north of Brail	2,100
Copper:			
Ore (concentrate, Cu content)	Compania Nationala REMIN S.A., Compania Nationala Minvest, and Moldomin S.A. (Government)	Baia Mare, Baia Sprie, and Cavnic Mines, in northwestern area near the Ukrainian border; Rosia Montana, Noud, Borsa Balan, and Lesul Ursului Mines, in east-west arc along the Carpathian range; Rosia Poieni Mine; Moldova Noua	27
Metal	Cuprom S.A. Baia Mare	Smelter and electrolytic refinery at Baia Mare	40
Ferroalloys, ferrochromium	S.C. Feral s.r.l.	Complex at Tulcea	NA
Iron ore	Compania Nationala Minvest (Government)	Mining complex at Hunedoara, in west-central Romania	1,320
Do.	do.	Resita Mining Complex, southwestern Romania	660
Do.	do.	Napoca-Cluj Mining Complex, northwestern Romania on the Somesul River	990

See footnotes at end of table.

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TABLE 2—Continued
ROMANIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Lead:				
In ore		Compania Nationala REMIN S.A. (Government)	Baia Mare Mine, near Ukrainian and Hungarian borders	12
Do.		Compania Nationala Minvest (Government)	Vetel Mine, near Deva	5
Metal		Sometra S.A. (Mytilineos Holdings S.A.)	Copsa Mica, central Romania	18 [2]
Do.		Neferal S.A. (member of Metanef Group)	Bucharest	25
Natural gas	million cubic meters	SNGN Romgaz S.A. (Romanian Ministry of Economy, 85.01%, and Fondul Proprietatea, 14.99%)	Operated more than 150 reservoirs in Moldova, Muntenia, and Transylvania regions	NA
Do.	do.	S.C. OMV Petrom S.A. [OMV AG, 51.01%; Romanian Ministry of Economy, 20.64%; Property Fund S.A. (Government), 20.11%]	Approximately 250 commercial oil and gas fields located in southern and western Romania and offshore in the Black Sea	NA
Petroleum:				
Crude		do.	do.	NA
Refined		do.	Arpechim Refinery, just south of Pitesti	3,500
Do.		do.	Petrobrazi Refinery, just south of Ploiesti	4,500
Do.		Rompetrol Rafinarie S.A. (Rompetrol Group)	Refinery at Navodari	4,500
Do.		Vega Ploiesti Refinery (Rompetrol Group)	Refinery just north of Ploiesti	500
Do.		S.C. RAFO S.A.	Refinery at Onesti	3,000 e
Do.		S.C. Petrotel S.A. (OAO Lukoil)	Refinery just east of Ploiesti	2,400
Do.		Astra Refinery	Refinery in Ploiesti	NA
Do.		Refinaria Petrolsub Suplacu de Barcau	Refinery at Suplacu de Barcau	NA
Do.		Darmanesti Refinery	Refinery at Darmanesti in eastern Romania	NA
Steel		ArcelorMittal Galati (ArcelorMittal, 100%)	Galati, north of Brail	4,500 e
Do.		ArcelorMittal Hunedoara (ArcelorMittal, 100%)	Hunedoara, west-central Romania, near Calan	NA
Do.		S.C. Donasid S.A. (Tenaris S.A., 99%)	Calarasi in southeastern Romania	470
Do.		S.C. TMK-Resita S.A. (OAO TMK, 100%)	Resita in southwestern Romania	450
Do.		Mechel Targoviste (OAO Mechel, 87%)	Targoviste	630 e
Do.		Mechel Campia Turzii SA (OAO Mechel, 87%)	Campia Turzii, northwestern Romania	300 e
Do.		Ductil Steel (OAO Mechel, 100%)	Otelu Rosu in southwestern Romania	400 e
Uranium		Compania Nationala a Uraniului (Government)	Suceava county	NA
Zinc:				
In ore		Compania Nationala Minvest (Government)	Baia Mare, near Ukrainian and Hungarian borders	12
Do.		Compania Nationala REMIN S.A. (Government)	Vetel Mine, near Deva	45
Metal		Sometra S.A. (Mytilineos Holdings S.A., 100%)	Copsa Mica, central Romania	62 [2]

Do., do. Ditto. NA Not available.
[1]The Cemtrade alumina plant at Oradea had been shut down since late 2006.
[2]The Sometra S.A. lead and zinc plant stopped production in January 2009 and had not restarted production by the end of the year.

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The Mineral Industry of Russia

By Richard M. Levine

Russia was one of the world's leading mineral producing countries. In 2009, Russia ranked among the leading world producers or was a leading regional producer of such mineral commodities as aluminum, arsenic, asbestos, bauxite, boron, cadmium, cement, coal, cobalt, copper, diamond, fluorspar, gold, iron ore, lime, magnesium compound and metals, mica flake and scrap and sheet, natural gas, nickel, nitrogen, oil shale, palladium, peat, petroleum, phosphate, pig iron, potash, rhenium, silicon, steel, sulfur, tin, titanium sponge, tungsten, and vanadium.

Minerals in the National Economy

The value of mineral output extracted in Russia had averaged about $200 billion per year in recent years. According to official Russian data, in 2009, the mineral extraction sector accounted for about 8% of the gross domestic product (GDP). The mineral sector, however, which would include mining and processing, reportedly contributed 59% of the GDP (Vercheba, 2009; Federal'naya Sluzhba Gosudarstvennoy Statistiki, 2011d).

In 2009, the extraction of fuel minerals accounted for 89.9% of the value of output of the mineral extraction sector (Vercheba, 2009; Federal'naya Sluzhba Gosudarstvennoy Statistiki, 2011h). Reported capacity utilization was lower than in 2008 for selected mineral commodities; for example, the capacity utilization for cement was 57% compared with 70% in 2008; for coal, 76% compared with 81%; and for crude steel, 73% compared with 83% (Federal'naya Sluzhba Gosudarstvennoy Statistiki, 2011f).

In 2009, the number of people employed in the mineral extraction sector decreased to 866,000 from 923,000 in 2008. Of this total, 567,000 were employed in mineral fuel extraction, including 399,000 who were employed in the extraction of oil and natural gas and 168,000 who were employed in the extraction of coal and peat. The metal mining sector employed 169,000 people, of which 107,000 were employed in the extraction of nonferrous metals and 62,000 were employed in the extraction of iron ore. Employment in all mineral extraction sectors was lower in 2009 than in 2008 (Federal'naya Sluzhba Gosudarstvennoy Statistiki, 2011j).

In 2009, 78.4% of Russia's total investment in geologic prospecting went to exploration for oil and gas, 7.7% went to exploration for precious metals, and 2.4% went to exploration for diamond. For each of the other categories, investment was less than 2% of the country's total exploration expenditure (Federal'naya Sluzhba Gosudarstvennoy Statistiki, 2011e).

Government Policies and Programs

Amendments to Russia's law on the use of subsurface resources, which were ratified on January 31, 2007, and further amended in 2008, set criteria for deposits containing strategic mineral commodities and limit the rights of foreigners to invest in a controlling stake in such deposits if the deposits have not yet been developed with foreign participation. Among the list of strategic mineral deposits are deposits containing lithium, niobium, platinum-group metals (PGM), uranium, and the heavy rare earths (Interfax Russia & CIS Metals and Mining Weekly, 2008).

Production

The value of output in the mining and quarrying sector in constant prices in 2009 decreased by 0.6% compared with that of 2008. In 2009, the value of fuel mineral production increased by 0.4% compared with that of 2008 but that of nonfuel minerals decreased by 7.4% (Federal'naya Sluzhba Gosudarstvennoy Statistiki, 2011c).

Structure of the Mineral Industry

At the end of 2009, Russia had 9,805 enterprises engaged in mining and quarrying, which was a 12.3% increase compared with the number of enterprises active in mining and quarrying in the previous year. Of these enterprises, 4,195 were engaged in extracting fuel minerals and the other 5,610 were engaged in mining nonfuel minerals (Federal'naya Sluzhba Gosudarstvennou Statistiki, 2011g, i). Russia had more than 100 large mining and beneficiation and mining and metallurgical enterprises that mined and processed ferrous and nonferrous metals (Chanturiya, 2007; Linyev and others, 2007).

Mineral Trade

In 2009, the total value of Russian exports decreased by 37% compared with that of 2008 (Federal'naya Sluzhba Gosudarstvennoy Statistiki, 2011b). Although the volume of many mineral commodity exports did not change significantly, the value of many mineral commodity exports did change owing to the decrease in world market prices for many mineral commodities in 2009. Reported trade data on selected mineral commodities are in table 3.

Russia was a major exporter of oil and natural gas, and these exports were a mainstay of the Russian economy. In recent years, Russia's economic growth had been based primarily upon oil and gas exports, and the country benefited greatly from high oil prices. In 2009, crude oil exports accounted for 33% of the total value of exports; petroleum refinery products, 16%; and natural gas, 14% (Federal'naya Sluzhba Gosudarstvennoy Statistiki, 2011b).

Commodity Review

Metals

Aluminum.—All Russian production of alumina, bauxite, and primary aluminum was controlled by United Company RUSAL, which was the world's leading producer of alumina

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and aluminum. RUSAL operated 15 aluminum smelters, which were located in four countries: Russia (12 plants), Nigeria (1 plant), Sweden (1 plant), and Ukraine (1 plant). RUSAL's main facilities were located in Russia in Siberia and accounted for about 85% of the company's aluminum output. Together, the Bratsk smelter and the Krasnoyarsk smelter in Siberia accounted for almost one-half of RUSAL's aluminum production, and these smelters were among the leading aluminum smelters in the world. RUSAL's aluminum smelters in Siberia had the advantage of access to low-cost and renewable hydroelectric power as their principal source of electricity (United Company RUSAL, 2010a, p. 21).

RUSAL had plans to further expand its aluminum smelting operation in Siberia with two projects—the BEMO and the Tayshet smelter projects, which together would increase production capacity by an additional 1.3 million metric tons per year (Mt/yr). The BEMO project involved the construction of the 3,000-megawatt (MW)-capacity BEMO hydroelectric powerplant and the Boguchanskiy aluminum smelter in the Krasnoyarsk region; the smelter would have the capacity to produce 588,000 metric tons per year (t/yr) of aluminum. The project was to be completed in two stages. The first stage was scheduled for completion by 2013, and the second stage, by the end of 2015 (United Company RUSAL, 2010a, p. 22).

The Tayshet aluminium smelter, which was to be located in Irkutsk, was to have a design capacity to produce 750,000 t/yr of aluminum. Construction of the smelter had been temporarily suspended owing to financing issues, and RUSAL was in the process of negotiating with foreign investors for financing.

In 2009, RUSAL operated 12 alumina refineries, which were located in six countries—Russia (five plants), Jamaica (two plants), Ukraine (two plants), Guinea (one plant), Ireland (one plant), and Italy (one plant). RUSAL also operated eight bauxite mines throughout the world and one nepheline syenite mine in Russia. In Russia, RUSAL's bauxite mining operations included the North Urals and the Timan bauxite mines, which had the capacity to produce 3.4 Mt/yr and 2.5 Mt/yr of bauxite, respectively (United Company RUSAL, 2010a, p. 23-25).

In 2009, production decreased at all RUSAL's alumina refineries and aluminum smelters in Russia. In 2009, aluminum consumption in Russia decreased to 550,000 t from 700,000 t in 2008 (Podvishenskiy and others, 2010). RUSAL's reduction in aluminum output was the result of the temporary suspension of production at its least-cost-efficient smelters—the Bogoslovsk, the Novokuznetsk, and the Uralsk aluminum smelters (United Company RUSAL, 2010a, p. 33). In 2009, bauxite production at RUSAL's mines in the North Urals increased by 2% compared with that of 2008 to 3.4 million metric tons (Mt); production remained at the 2008 level of about 1.9 Mt at the Timan Mine in the Komi region in the northwest of the country (United Company RUSAL, 2010a, p. 35).

RUSAL was planning to restart construction of the Cheremukhovskaya Mine at the Severuralbokistruda [North Urals] (SUBR) mining complex. The mine had been planned to be commissioned in 2009, but another 3 years of work were needed to make the mine operational. The new mine would increase the production capacity at SUBR by 1.35 Mt/yr (Podvishenskiy and others, 2010).

In 2009, RUSAL was actively seeking project financing to revive construction of the Boguchanskiy and the Tayshet aluminum smelters. RUSAL assumed that there would be a restoration of the global aluminum market in 2010 and, accordingly, was planning to increase production of aluminum by 3% during 2010. The increase in production was expected to result from increased production at RUSAL's Siberian plants and by having potline 5 at the Irkutsk aluminium smelter produce at full capacity (United Company RUSAL, 2010a, p. 19; 2010b).

Copper.—In 2009, refined copper production in Russia decreased slightly compared with that of 2008. Production of blister and refined copper took place at three enterprises—OJSC Mining and Metallurgical Company (MMC) Norilsk Nickel, Ural Mining and Metallurgical Co. (UMMC), and ZAO Russian Copper Co. (RCC); these enterprises mined copper and produced 47%, about 40%, and about 13%, respectively, of the country's refined copper output. Copper in ore and concentrate was also produced at a number of enterprises that mined polymetallic ores containing copper. Copper in concentrate production was estimated to have increased by about 10% compared with that of 2008. Exports of refined copper increased by almost 2.5 times to about 510,000 t from about 206,000 t in 2008. Domestic consumption of refined copper decreased to 373,600 t from 687,400 t in 2008 because of the sharp decrease in demand at practically all domestic enterprises that used copper (Podvishenskiy and others, 2010).

At Russia's leading copper producing enterprise, Norilsk, refined copper production totaled 402,000 t at the company's operations in Russia, which was about 4% less than Norilsk produced in 2008. In 2009, copper production accounted for 26% of Norilsk's revenue. At the company's major mining operations on the Taymyr Peninsula in East Siberia, Norilsk continued its trend of mining larger quantities of cuprous ores, which have a higher copper content than do the nickel-rich ores, which were being depleted. Norilsk also increased production of disseminated ores, which have lower grades of all metals [OJSC Mining and Metallurgical Company (MMC) Norilsk Nickel, 2010a, p. 57].

In 2009, UMMC, which was the country's second-ranked copper producer, completely fulfilled its raw material production plan. The OAO Gayskiy mining and metallurgical complex, which was UMMC's largest mining complex in terms of the volume of production, exceeded its production target for ore by producing 5.664 Mt of ore, of which 4.370 Mt was mined from underground mines. UMMC produced 521,752 t of copper concentrate containing 78,263 t of copper. A new electrolytic refining shop was under construction at UMMC's leading metallurgical enterprise, OAO Uralelektromed. The first stage of the shop was planned to go into operation in 2011. UMMC planned eventually to increase its production capacity to 500,000 t/yr of copper cathode (Podvishenskiy and others, 2010).

RCC, which was the country's third ranked copper producer, had the capacity to produce 200,000 t/yr of copper cathode. The major enterprises that comprised RCC were the Aleksandrinskaya copper mining company and the ZAO Karabashmed' and the ZAO Kyshtymskiy copper smelters. In 2009, Karabashmed produced 67,000 t of blister copper compared with 51,000 t in 2008; it planned to increase its output to 72,000 t in 2010 (Podvishenskiy and others, 2010).

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Norilsk was planning to reduce its copper production to between 363,000 t and 367,000 t in 2010, but RCC and UMMC planned to increase copper output by between 40,000 and 50,000 t, which would compensate for decreased output at Norilsk. The country's most prospective site for increasing copper production was the Udokan deposit in Zabaykal'skiy Kray, which was one of the world's largest undeveloped copper deposits. Reserves at Udokan, which were reported according to the classification system used in the Soviet Union and then adopted by Russia, were 1.2752 billion metric tons (Gt) of ore containing 19.95 Mt of copper (Podvishenskiy and others, 2010).

The major problem that the Russian copper industry faced in increasing production to meet increasing global demand was insufficient reserves at existing mining enterprises. Norilsk was attempting to solve this problem by trying to confirm additional reserves at its existing enterprises and in other regions of the country, as well as by developing deposits abroad. For UMMC, the situation was more complicated, as its deposits were almost depleted and UMMC's deposits in the Altay region were not large. Furthermore, planning for the development of Udokan had been dragging on for many years. Besides Udokan, planning continued for the development of other known large deposits, including the Chineyskoye copper deposit in the Zabaykal'ye region (Podvishenskiy and others, 2010).

Gallium.—Russia produced between 10 and 13 t/yr of gallium, consumed up to 1 t/yr, and exported about 10 t/yr (Naumov, 2010). Gallium reserves in Russia reportedly exceed 9,000 t. Processing capacity existed for producing metallic gallium at the JSC Achinsk alumina plant, the JSC Pikalevo alumina plant, and the OOO Galliy enterprise.

Germanium.—Russia produced between 5 and 6 t/yr of germanium (calculated in metal content), consumed up to 500 kilograms per year (kg/yr) of germanium metal and 600 kg/yr of germanium oxide (Ge_2O_3), and exported between 4 and 5 t/yr of germanium metal and up to 2 t/yr of Ge_2O_3 (Naumov, 2010). Germanium was produced at the Federal State Unitary Enterprise Germanium, which was founded in 1991 based on the germanium production facilities at the Krasnoyarsk nonferrous metals plant. The Germanium enterprise was the only large-scale germanium producer in Russia. It produced germanium from different materials, which included ashes from coal burning, germanium concentrates containing 2% or more germanium, production waste, and secondary raw material of various origins. Germanium production employed about 180 people (OJSC Germanium, 2010a-e).

Gold.—In 2009, gold production in Russia from mine output increased by almost 11% compared with that of 2008, and growth came mainly from deposits in Amurskaya Oblast', Chukotskiy Avtonomnyy Orkrug, Irkutskaya Oblast', and Kamchatskiy Kray. Gold mining took place in 23 regions, of which 13 produced more than 1 t each in 2009. The number of gold mining enterprises decreased by about 5% to 400 from 421 during 2009. The number of gold mining enterprises producing less than 100 kg/yr decreased by about 10% to 236 from 261. In 2009, 22 gold mining companies produced more than 1 t each, which was the same number as in 2008. These 22 enterprises mined 14.6% more gold in 2009 than in 2008 and produced 79.8% of the total output of the country in 2009 compared with 75.8% in 2008. Foreign-owned companies increased their extraction of gold by 29.5%, and their output accounted for 27.4% of the country's total output (Brayko and Ivanov, 2010).

In 2009, output from hard rock deposits increased by 15,575 kg but decreased at placer deposits by 1,178 kg. Gold held by the Russian Government as currency reserves as of January 1, 2009, totaled 520 t; on January 1, 2010, the total was 637.6 t (Brayko and Ivanov, 2010).

Indium.—In Russia, indium reserves are present mainly in deposits of copper-zinc-pyrite and tin ores. In Russia, zinc and indium were extracted from porphyry copper deposits in the Ural Mountains, where 75% of the country's zinc concentrates were produced and which had an average indium content of 3.2 grams per metric ton (g/t). Indium was also obtained from lead-zinc ores from deposits in southern Siberia and the Maritime Province in the Russian Far East where the indium content averaged 14.7 g/t. Indium reserves have been identified in 61 deposits in the country.

Indium reserves in Russia, reportedly, have been estimated to be about 4,000 t (Global Information, Inc., 2007). Until the middle of the 1990s, indium was being produced at the Chelyabinsk zinc plant, the OAO Elektrotsink plant in Vladikavkaz, and the Novosibirsk tin complex. High-purity indium (99.99%) also was being produced at the Podol'sk chemical-metallurgical plant. In 2007, indium was being produced only at the Chelyabinsk and the Elektrotsink plants. The Chelyabinsk plant had the capacity to produce from 3 to 6 t/yr of indium, and the Elektrotsink plant had the capacity to produce up to 6 t/yr. In 2008, Russia exported 4.7 t of indium, of which 750 kg was secondary indium produced from recycled material. Primary indium was produced only at the Chelyabinsk plant, which had been producing between 4 and 5 t/yr of indium in recent years; the remaining indium was produced from recycled material (Naumov, 2009).

Iron and Steel.—In 2009, production of crude steel decreased by almost 14% compared with that of 2008. Structural changes took place in the methods used to produce steel—the percentage of steel produced in oxygen converter furnaces increased to 64.3% of total output compared with 56.6% in 2008, that of steel produced in electric furnaces decreased to 27.2% of the total compared with 29.1% in 2008, and that of steel produced in open hearth furnaces decreased to 8.5% of the total compared with 14.3% in 2008. Less steel was produced in each furnace type in 2009 than in 2008. Output in the iron and steel industry was highly concentrated in nine enterprises, which, in 2009, produced 84.5% of the country's total steel output, 91.4% of its pig iron output, and 86.6% of its rolled-steel output. Production of crude steel at these nine leading enterprises in 2009 was as follows: the Magnitogorsk mining and metallurgical complex (9.7421 Mt), Cherepovets metallurgical complex (9.4829 Mt), Novolipetsk metallurgical complex (8.5072 Mt), Zapsib metallurgical complex (6.0039 Mt), Chelyabinsk metallurgical complex (4.5396 Mt), Nizhniy Tagil metallurgical complex (3.8783 Mt), Oskol electric metallurgical complex (3.2499 Mt), Ural Steel Works (3.165 Mt), and Novokuznetsk metallurgical complex (1.3975 Mt). In 2009, production of steel and rolled steel decreased at seven of these nine enterprises, increasing at only the Novokuznetsk and the Oskol complexes.

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Production of pig iron increased at only the Chelyabinsk and the Novolipetsk complexes and the Ural Steel enterprise (Katunin, 2010).

Iron Ore.—In 2009, iron ore output decreased at all the country's major iron ore mining complexes except for the KMAruda, the Kovdor, and the Olenegorsk complexes. The nine leading iron ore mining and beneficiation complexes produced 87.3% of the total value of output. In 2009 compared with 2008, output decreased at the following iron ore mining enterprises: Mikhaylovka mining and beneficiation complex (GOK) (by 14% to 15.6846 Mt), Lebedi GOK (12.7% to 16.0403 Mt), Korshunovo GOK (11.5% to 4.2075 Mt), Karel'skiy pelletizing complex (5.6% to 9.3017 Mt), Stoilo GOK (3.8% to 12.6598 Mt), and Kachkanar GOK (2.8% to 8.4494 Mt). Output increased at the following enterprises: KMAruda complex (by 4.3% to 2.1953 Mt), Olenegorsk GOK (2.5% to 4.7939 Mt), and Kovdor GOK (2.2% to 5.5446 Mt). Almost all iron ore mining enterprises remained under the control of metallurgical holding companies, which ensured the supply of iron ore for the domestic steel industry. The main market for Russian iron ore remained the domestic market (Katunin, 2010).

Lead and Zinc.—In 2009, production of lead, including secondary lead, decreased by about 8.8% compared with that of 2008, but output of lead in concentrate increased by about 17%. Primary lead was produced at the Elektrotsink enterprise and the Dalpolimetal mining and metallurgical complex. Secondary lead production was widely dispersed among various types of enterprises and locations. Owing to the steep drop in lead prices, the Dalpolimetal enterprise ceased lead production from November 2008 to April 2009, and fully resumed production in May 2009. Dalpolimetal was the country's leading producer of lead concentrates and accounted for about 70% of the country's production. Because of Dalpolimetal's location in the far eastern part of Russia, it exported most of its concentrates, but it also had the capacity to produce lead metal. Resources of lead scrap were generally in short supply, which created greater demand for the high-quality concentrate produced at Dalpolimetal. In 2009, Dalpolimetal exported 133,400 t of lead concentrate, which was 11.1% more than in 2008; the majority of its exports of lead concentrate went to China (Podvishenskiy and others, 2010).

In 2010, the Elektrotsink enterprise was expected to increase its production of lead metal to 40,000 t with the recovery in the price of lead. Elektrotsink's development plans for the period from 2007 to 2015 called for increasing lead output to 50,000 t/yr. Dalpolimetal would continue to produce mainly lead concentrates for export (Podvishenskiy and others, 2010).

In 2009, zinc metal production decreased by more than 13% compared with that of 2008. Almost all zinc metal production took place at two enterprises—the OAO Chelyabinsk electrolytic zinc plant and the Elektrotsink plant, which also produced lead metal. Apparent domestic consumption of zinc was 162,200 t, which was 17.2% less than in 2008 (Podvishenskiy and others, 2010).

The country's leading zinc producer was the Chelyabinsk plant, which in 2009 produced 119,931 t of commercial special high grade (SHG) zinc (99.995% zinc) and alloys based on SHG zinc, which was 20% less than in 2008. Chelyabinsk also controlled several zinc mining and metals producing enterprises outside the country. Chelyabinsk sold about 64% of the zinc it produced on the domestic market. In 2010, Chelyabinsk planned to increase production of SHG zinc and its alloys to 153,000 t in 2010, to 160,000 t by 2011, and to 175,000 t by 2012. If there were to be a sufficient increase in the price of zinc, Chelyabinsk could increase zinc output to almost 200,000 t in 2014 (Podvishenskiy and others, 2010).

The Elektrotsink plant, which ranked second in domestic zinc metal production, produced 100,000 t of zinc metal in 2009. It exported 79,700 t of zinc metal, primarily to Turkey (40,200 t), the Netherlands (12,400 t), and Malaysia (9,100 t). Elektrotsink planned to produce about 110,000 t of zinc metal in 2010. Domestic demand was projected to increase to 186,000 t. In order to supply the domestic zinc metal plants with adequate raw material, the company planned to restart production at the Korbalikhinskoye and the Stepnoye polymetallic deposits in the Altayskiy Republic, which contain copper, gold, lead, silver, and zinc (Podvishenskiy and others, 2010).

Molybdenum.—In 2009, Russian molybdenum concentrate production totaled 10,500 t, which was 14.6% more than in 2008. Production of ferromolybdenum was 6,700 t, which was an increase of 15.2%. Russia's leading producer of molybdenum and ferromolybdenum was the Strikeforce Mining and Resources Co. (SMR), which was part of the holding company Bazovyy Element [Basic Element]. SMR included a number of companies engaged in exploration, mining, beneficiation, and metallurgy. The major companies within SMR were the Chelyabinsk electro-metallurgical complex, the Sorsk ferromolybdenum plant, the Sorsk mining and beneficiation complex, the Zabaykalstal'invest mining and beneficiation complex, the Zhireken ferromolybdenum plant, and the Zhireken mining and beneficiation complex. The Sorsk and the Zhireken mining and beneficiation complexes and the Sorsk and the Zhireken ferromolybdenum plants produced all the country's output of molybdenum concentrate and ferromolybdenum in 2009 (Podvishenskiy and others, 2010).

In 2009, the major increase in molybdenum output took place at the Sorsk complex in the Republic of Khakasiya, which was the county's leading enterprise for mining molybdenum ore; the increase in ferromolybdenum output took place mainly at the Sorsk ferromolybdenum plant. In 2009, the Sorsk complex produced 6,900 t of molybdenum concentrate and the Sorsk ferromolybdenum plant produced 3,900 t of ferromolybdenum (Podvishenskiy and others, 2010).

The Zhireken complex and Zhireken ferromolybdenum plant also increased output in 2009. They produced 3,600 t of molybdenum concentrate and 2,800 t of ferromolybdenum, respectively, which was a 15% and a 40% increase, respectively, compared with that of 2008 (Podvishenskiy and others, 2010).

In 2009, Russia exported 21 t of molybdenum concentrate, of which 20 t went to Latvia. In 2008, Russia exported 18 t. In 2009, Russia imported 752 t of molybdenum concentrate, with imports coming primarily from Iran (278 t), the Netherlands (250 t), and Chile (120 t). Russia's apparent consumption of molybdenum concentrate was 11,230 t; the vast majority of the concentrates was used in the production of ferromolybdenum, which was then exported (Podvishenskiy and others, 2010).

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Russia's plans called for producing 12,000 t of molybdenum concentrate and between 7,500 t and 7,700 t of ferromolybdenum in 2010. To increase molybdenum production, the Government planned to commission an open pit mine and beneficiation plant based on ore from the Yuzhno-Shameyskoye copper-molybdenum deposit in Sverdlovsk Oblast', and to examine the feasibility of developing the Oynogorskoye tungsten-molybdenum deposit in the Republic of Buryatiya; the development period for this project was projected to be 8.5 years (Podvishenskiy and others, 2010).

Nickel.—In 2009, nickel production in Russia was relatively stable, decreasing by less than 2%, which was less than the world decrease in nickel production. In 2009, Russia's nickel exports decreased by 3.2% compared with those of 2008. The country exported almost 95% of the nickel it produced, and domestic nickel consumption apparently accounted for most of the remaining output.

Russia was the world's leading nickel mining country in 2009 (Kuck, 2011). Norilsk was the country's leading nickel producer and the world's leading nickel mining company. Nickel accounted for 50% of Norilsk's revenues in 2009. Norilsk's operations in Russia were located on the Kola Peninsula in the northwest of the country and in the Noril'sk region on the Taymyr Peninsula in East Siberia. Norilsk mined mixed sulfide ores on the Taymyr Peninsula from seven mines at the Oktyabrskoye, the Norilsk-1, and the Talnakh deposits. Ores mined were classified as nickel rich, cuprous, and disseminated, and had differing contents of cobalt, copper, gold, nickel, palladium, platinum, and other ore constituents. Ore was beneficiated at the Norilsk and Talnakh concentrators. The Norilsk concentrator beneficiated the entire volume of cuprous and disseminated ores from the Oktyabrskoye and the Talnakh deposits. The Talnakh concentrator processed nickel rich ores mined at the Oktyabrskoye and the Talnakh deposits to produce copper, nickel, and pyrrhotite concentrates [OJSC Mining and Metallurgical Company (MMC) Norilsk Nickel, 2010a, p. 18].

Metallurgical facilities on the Taymyr Peninsula included the Nadezhda metallurgical plant, the Nickel plant, and the Copper plant. The Nadezhda metallurgical plant processed all nickel and pyrrhotite concentrates produced by the Talnakh concentrator and about 15% of the nickel concentrates from the Norilsk concentrator. The Nickel plant processed about 85% of the nickel concentrate produced by the Norilsk concentrator, all beneficiated stockpiled pyrrhotite concentrate, and some high-grade matte from the Nadezhda metallurgical plant to produce nickel cathodes and cobalt [OJSC Mining and Metallurgical Company (MMC) Norilsk Nickel, 2010a, p. 18].

On the Kola Peninsula, three mines extracted disseminated mixed sulfide ores from the Kotselvaara, the Semiletka, the Zapolyarnoye, and the Zhdanovskoye deposits. The mined ore was beneficiated at a concentrator, which produced copper and nickel concentrates that were then sent to the smelting shop for further processing. The refinery at Monchegorsk on the Kola Peninsula processed both high-grade matte from the Kola Penisula and matte received from the Taymyr Peninsula to produce (in order of economic value) nickel cathodes, carbonyl nickel, copper cathodes, precious metal concentrates, cobalt concentrate, and sulfuric acid [OJSC Mining and Metallurgical Company (MMC) Norilsk Nickel, 2010a, p. 19].

In 2009, the mines on the Taymyr Peninsula produced a total of 15.3 Mt of ore. Ore output for all ore grades changed compared with that of 2008; the output of nickel-rich ore decreased by 131,700 t (or by 1.8%), the output of cuprous ore increased by 381,600 t (7.9%), and the output of disseminated ore increased by 14,400 t (0.5%) [OJSC Mining and Metallurgical Company (MMC) Norilsk Nickel, 2010a, p. 56].

In 2009, ore mined by Norilsk on the Kola Peninsula totaled 7.9 Mt, which was 257,000 t less than in 2008. This reduction was attributed primarily to the depletion of reserves as well as to difficulties that arose in switching from open pit mining to underground mining at the Zhdanovskoye deposit [OJSC Mining and Metallurgical Company (MMC) Norilsk Nickel, 2010a, p. 59].

In 2009, Norilsk's output of refined nickel increased by 2%. To maintain nickel output levels, stockpiled pyrrhotite concentrate from the Kayerkanskiy coal strip mine was processed using the hydrometallurgical and pyrometallurgical facilities of the Nadezhda metallurgical plant [OJSC Mining and Metallurgical Company (MMC) Norilsk Nickel, 2010a, p. 58].

On the Taymyr Peninsula, the average grade of nickel in ore was 1.52%, and the average grade on the Kola Peninsula was 0.65%. Norilsk continued with construction of mining facilities and continued with its construction, design, and feasibility studies for projects on the Taymyr Peninsula, including development of the Skalisty Mine. At the Oktyabrskiy Mine, construction of shafts was continuing, which would increase the cuprous ore mining capacity to 3 Mt/yr; the design capacity was scheduled to be achieved in 2013.

In 2010, investment at Norilsk was to be concentrated on exploration to increase the company's raw material base to maintain and increase output. Investment was also being directed towards modernizing equipment and introducing new technology. Norilsk reportedly had adequate reserves to maintain production levels for 25 years at its 2009 level of output, and its explored mineral-raw material base in eastern Siberia was declared sufficient to maintain production for 60 years [Podvishenskiy and others, 2010; OJSC Mining and Metallurgical Company (MMC) Norilsk Nickel, 2011].

Nickel was also produced in much smaller amounts at three other producers in the Ural Mountains region—OAO Ufaleynikel, OAO Yuzhuralnikel, and ZAO Rezhnikel. Ufaleynikel was the country's second ranked nickel producer and was part of the company Industrial Metallurgical Holding. Ufaleynikel had the capacity to produce 18,000 t/yr of nickel and accounted for 3% of the country's nickel output. In 2009, Ufaleynikel decreased output by 46.1% compared with that of 2008. Construction of a fourth furnace had been underway at the Ufaleynikel facility and was commissioned in February 2010 with the capacity to produce 150 metric tons per day (t/d) of nickel. No plans were in place to restore cobalt production at Ufaleynikel, which was stopped when shipments of cobalt concentrate to the enterprise stopped (Podvishenskiy and others, 2010).

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Yuzhuralnikel had a loss of 165 million rubles[1] in the fourth quarter of 2009 compared with a profit of 407 million rubles in the third quarter of the year. The main reason for the loss of profitability was a 53% increase in the price of coke in the third quarter. Total profits in 2009 were 22 million rubles compared with 233 million rubles in 2008 (Podvishenskiy and others, 2010).

Owing to the sharp drop in the price of nickel, in 2009, Rezhnikel discontinued production and resumed producing in July only at two of its three furnaces. Rezhnikel expected that nickel prices would stabilize in 2010 and planned to restart the third furnace then (Podvishensky and others, 2010).

Niobium (Columbium).—The country's niobium reserves are located in 22 deposits. Russia reportedly ranked second in the world to Brazil in its quantity of reserves of niobium pentoxide. More than 65% of the reserves are located in eastern Siberia, and 30% are located in Murmanskaya Oblast'. Among the country's large niobium deposits are the Beloziminskoye and the Bol'shyegtagninskoye carbonate deposits in Irkutskaya Oblast' which have ore with an average Nb_2O_5 content of up to 1%. The Tomtor deposit in the Sakha (Yakutiya) Republic, has ore assessed to have an Nb_2O_5 content of up to 7% and a rare-earth elements content of up to 9% (Kremnetskiy and others, 2009).

Despite having considerable niobium reserves, Russia produced only a small amount of niobium and had been importing annually up to 1,000 t for its metallurgical industry. The only enterprise that mined niobium was the Karnasurt mining enterprise, which was subsidiary of AO Sevredmet, which mined the Lovozerskoye loparite deposit on the Kola Peninsula (Kremenetskiy and others, 2009).

A number of mining enterprises had produced niobium during the Soviet period, but closed following its dissolution; these included those mining the Orlovskoye tantalum-niobium deposit, the Zavitinskoye beryllium-lithium-niobium-and tantalum deposit, and the Etykinskoye tantalum-niobium deposit in Zabaykal'skiy Kray; the Vyshnevogorskoye niobium deposit in Chelyabinskaya Oblast', and the Tatarskoye niobium deposit in Krasnoyarskiy Kray (Kremenetskiy and others, 2009).

A Russian development program envisioned processing 12,000 t/yr of loparite ore from Lovozerskoye at the OAO Chepetsiky machinery manufacturing plant, which would result in production of 3,900 t/yr of titanium dioxide, 873 t/yr of niobium pentoxide, 472 t/yr of neodymium oxide, 310 t/yr of zirconium dioxide, 280 t/yr of lanthanum oxide, 61 t/yr of tantalum pentoxide, and 56 t/yr of praseodymium oxide (Kurkov and Kotova, 2007). The Katuginskyoe deposit in Zabaykal'skiy Kray was projected to be a significant supplier of niobium after 2010. The largest and most significant prospective source of niobium was the Tomtorskoye deposit on the Taymyr Peninsula in East Siberia, which had an average contained niobium oxide content of 6.71%. The first stage of a planned mining enterprise to develop this deposit was projected to produce 10,000 t/yr of ore with reserves adequate to maintain production for about 100 years (Kurkov and Kotova, 2007; Mashkovtsev and others, 2009).

Platinum-Group Metals.—In 2009, Russia was the world's second ranked producer of platinum-group metals (PGM) following South Africa, and these two countries combined produced more than 85% of the world's PGM output (Loferski, 2011). Because of differences in the composition of the ores in Russia and South Africa, Russia was the world's leading palladium producer and the second ranked platinum producer whereas South Africa ranked first in platinum production but second in palladium production. Russia's production of PGM, unlike that of South Africa's, was a byproduct of the mining of mixed sulfide ores by Norilsk. Norilsk mined these ores mainly in East Siberia but also on the Kola Peninsula. The ores were mined primarily for their nickel content, but the ores also were rich in cobalt, copper, gold, PGM, and other ore constituents. A small amount of PGM in Russia was mined from placer deposits, which produced primarily platinum.

Data for Norilsk's mineral resources and ore reserves in Russia as of December 31, 2009, were reported based on the results of the independent audit performed by Micon International Company Ltd. in accordance with the principles of the Joint Ore Reserves Committee (JORC) Code of the Australasian Institute of Mining and Metallurgy. Proved and probable reserves for the six PGM (iridium, osmium, palladium, platinum, rhodium, and ruthenium) was 71,778,000 troy ounces (about 2,200 t), of which 55,018,000 troy ounces (about 1,700 t) was palladium and 13,439,000 troy ounces (about 420 t) was platinum [OJSC Mining and Metallurgical Company (MMC) Norilsk Nickel, 2010b]. The ore grade of PGM at Norilsk had been decreasing and in 2009 averaged 8.06 g/t compared with 8.43 g/t in 2008 and 8.92 g/t in 2007 [OJSC Mining and Metallurgical Company (MMC) Norilsk Nickel, 2010a, p. 53].

Production of platinum and palladium each accounted for 11% of Norilsk's revenues in 2009 [OJSC Mining and Metallurgical Company (MMC) Norilsk Nickel, 2011]. In 2009, Norilsk's operations in Russia produced 636,000 troy ounces (19.8 t) of platinum, which was slightly more than the 632,000 troy ounces (19.7 t) it produced in 2008, and 2,676,000 troy ounces (83.2 t) of palladium, which was slightly less than the 2,707,000 troy ounces (84.2 t) it produced in 2008. Norilsk's production of both platinum and palladium was higher in 2007 than in 2008 and 2009 [OJSC Mining and Metallurgical Company (MMC) Norilsk Nickel, 2010a, p. 55].

In 2009, the ZAO Amur Artel placer mined 3,654 kg of platinum, which was 4% less than in 2008. The ZAO Koryakgeoldobycha placer mining enterprise, owing to depleted reserves, curtailed platinum output by about 50% in 2009 to 817 kg compared with 1,630 kg in 2008 [OJSC Mining and Metallurgical Company (MMC) Norilsk Nickel, 2010a, p. 55; Brayko and Ivanov, 2010].

Barrick Gold Corp. of Canada estimated at the end of 2006 that its Fedorova Tundra deposit in the Murmansk region contains measured and indicated resources of 1.1 million troy ounces (about 34 t) of palladium and 300,000 troy ounces (about 9 t) of platinum, and inferred resources of 1.3 million troy ounces of palladium (about 40 t) and 300,000 troy ounces (about 9 t) of platinum. Barrick later stated that continued exploration might double the size of the reserves (Interfax Russia & CIS

[1]Where necessary, values have been converted from Russian rubles to U.S. dollars (US$) at the rate of 31.74 rubles=US$1.00 in 2009 and 24.853 rubles=US$1.00 in 2008.

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Metals and Mining Weekly, 2009). Barrick planned to mine the deposit to produce concentrate, which would be processed at Norilsk's Severonikel plant on the Kola Peninsula. Production was scheduled to commence in 2010, and output was projected to be 150,000 t/yr of concentrate that contains 98 g/t of PGM (Interfax Russia & CIS Metals and Mining Weekly, 2009).

Rare Earths.—Reserves of rare earths are located in 14 deposits but were being mined only at the Lovozerskoye deposit on the Kola Peninsula. Rare-earth elements make up 32% of the loparite ore. The largest source of rare-earth metal resources are the apatite-nepheline ores on the Kola Peninsula, which contain more than 60% of the country's resources; this ore, however, was not being processed for rare-earth metals. Other deposits include the Seligdarskoye apatite deposit in the Sakha (Yakutiya) Republic, which contains almost 23% of the country's reserves, and the Ulug-Tanzekskoye and the Yeregskoye oil-bearing sandstone deposits, which contain rare-earth metal reserves and are also located in the north of the Sakha (Yakutiya) Republic (Kurkov and Kotova, 2007).

The JSC Sevredmet enterprise, which is located in the mountainous part of Lovozero district, produced loparite concentrate, which is a raw material for the production of niobium, rare-earth metals, and tantalum. At the Lovozero deposit, one of the two underground mines of the Karnasurt Mine had started operations in 1951, and the Umbozero Mine began operations in 1984.

In 1990, the Soviet Union produced 744 t of rare-earth metal oxides and 25,400 t of loparite concentrate. Following the dissolution of the Soviet Union, rare-earth metal consumption practically ceased. By 1998, the Sevredmet enterprise faced serious difficulties owing to a large decrease in product sales—the production of loparite concentrate was only 1,000 t. After the dissolution of the Soviet Union, yttrium and other rare earths were mined and processed mainly in Kazakhstan and Kyrgyzstan (Kurkov and Kotova, 2007; Vereschagin and others, 2006).

The potential existed to implement or restart rare-earth metals production at enterprises of the Russian Federal Agency for Atomic Energy and Non-Ferrous Metals, which include the JSC Uralredmet in Verkhnaya Pyshma, the Production Association Mayak in Ozersk in the Chelyabinsk region, and the Siberian Integrated Works in Seversk in the Tomsk region. Russian enterprises that produced rare-earth metal end products were using imported raw materials (Vereschagin and others, 2006).

The richest source of rare-earth ores in Russia is the Tomtorskoye deposit on the Taymyr Peninsula. The yttrium oxide content of the ore is between 0.5% and 0.8%. An economic assessment of this deposit determined that it would be economic to mine even at the small production level of 100,000 t/yr of ore. Much effort also was being directed towards exploring for compact heavy rare-earth deposits, and success was reported in discovering such deposits in the Primorskiy Kray (Vereschagin and others, 2006; Kurkov and Kotova, 2007; Kremnetskiy and others, 2009).

Selenium.—Russia produced about 140 t/yr of selenium, consumed between 50 and 60 t/yr, and exported between 80 and 100 t/yr (Naumov, 2010). In Russia, selenium was produced at the JSC Kyshtym copper electrolytic plant, which produced between 3 and 4 t/yr; by Norilsk, which produced up to 80 t/yr; and by the UMMC, which produced between 80 and 90 t/yr (Kul'chitskiy and Naumov, 2010a).

Silver.—In 2009, silver output increased by 8% compared with that of 2008, mainly owing to increased output in the Amurskaya Oblast', the Chukotskiy Avtonomyy Okrug, and the Khabarovskiy Kray. Domestic demand for silver for jewelry decreased by 16.3% to 224.98 t in 2009 compared with 268.83 t in 2008. OAO Polimetal was the country's leading silver producing enterprise, and it increased production in 2009 by 0.6% to 538 t. Polimetal's major silver mining enterprise was the Dukat Mine. Polimetal was planning to increase production in 2010 to between 590 and 620 t. The ZAO Chukotka mining and processing complex was the country's second ranked silver producer; in 2009, it produced 255 t (Brayko and Ivanov, 2010).

Tantalum.—Russia produced between 39 and 40 t/yr of tantalum pentoxide, consumed between 1 and 2.5 t/yr, and exported between 37 and 39 t/yr (Naumov, 2010). Russian tantalum consumption in 2007 (the latest year for which data were available) was reported to be about 10 t/yr, but could be 100 t/yr by 2010. Reserves of tantalum occur in 21 deposits and almost all these deposits contain niobium. Tantalum was being mined from the Lovozerskoye deposit on the Kola Peninsula. Tantalum mining at the Etykinskoye deposit of the Zabaykalskiy mining and beneficiation complex had practically ceased. It would likely not be possible to satisfy future Russian tantalum demand by mining these two deposits. Mining at the Lovozerskoye deposit and Zabaykalskiy mining enterprises was either on the verge of being unprofitable or was unprofitable. Russia did not have any enterprises that produced metallic tantalum and had depended on tantalum metal that had been produced at the Ulba plant in Kazakhstan. The most prospective deposit for tantalum development was considered to be the Katuginskoye deposit in Zabaykal'skiy Kray (Kurkov and Kotova, 2007).

Tellurium.—Russia produced between 33 and 35 t/yr of tellurium, consumed up to 10 t/yr, and exported between 20 and 25 t/yr (Naumov, 2010). The UMMC produced more than 30 t/yr and Norilsk produced less than 3 t/yr (Kul'chitskiy and Naumov, 2010b).

Tin.—In 2009, production of tin in ore was estimated to have decreased by 20% compared with that of 2008, and production of tin metal decreased by 17%. Tin and its alloys and compounds were produced at three enterprises—the OAO Novosibirsk tin complex (OAO NOK), which was the country's leading tin producing enterprise; OAO Ryaztsvetmet; and the Zavod pripoyev. At OAO NOK, production decreased owing to the decrease in the global price for tin following the decrease in demand that took place because of the global economic crisis. In 2009, tin metal exports totaled 430 t compared with 384 t in 2008. Of the total volume of tin exports, 307 t went to Kazakhstan, 52 t went to Uzbekistan, and 42 t went to the Netherlands. Russia also imported tin metal; in 2009, the country imported 1,703 t compared with 1,915 t in 2008. Apparent tin consumption in 2009 was 2,820 t. Tin production was projected to increase to 2,100 t in 2010, and apparent tin consumption was projected to increase to 3,000 t. In June 2010, however, OAO NOK was seeking to declare bankruptcy

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because of outstanding loans from a number of Russian banks. Increasing tin ore production would be difficult without special Government subsidies because Russia's tin resources were not considered profitable to develop; it appeared, therefore, that Russia would have to maintain imports of tin to meet domestic needs (Podvishenskiy and others, 2010).

Titanium.—In 2009, production of titanium sponge in Russia decreased by 24% compared with that of 2008 to 26,600 t. Production of rolled titanium decreased by 30.3% to 19,500 t. Russia was dependent on imports from Ukraine for the majority of its titanium raw material (Podvishenskiy and others, 2010).

OAO Verkhnaya Salda Metallurgical Production Association-Avisma (VSMPO-Avisma) was Russia's only major titanium producer and one of the world's leaders in titanium production. More than 85% of its output was titanium products; it also produced aluminum panels and profiles and ferrotitanium. The Russian titanium industry was oriented to producing for the global market, and the global downturn in demand for titanium in industrial uses, including in the aerospace industry, directly affected Russian titanium output (Podvishenskiy and others, 2010).

In 2009, Russia exported 20,200 t of rolled titanium compared with 22,300 t in 2008. The main recipients of Russian titanium exports were the United States (8,503 t), Germany (2,671 t), the Netherlands (2,295 t), the United Kingdom (1,599 t), China (1,486 t), and Ukraine (855 t). Estimated domestic consumption of rolled titanium in 2009 was 3,000 t compared with 5,500 t in 2008. VSMPO-Avisma planned to increase rolled titanium output by 10% to about 21,500 t in 2010 and was looking to China to increase its sales (Podvishenskiy and others, 2010).

Tungsten.—In 2009, production of tungsten concentrate decreased by 31.9% to an estimated 6,600 t. Almost all Russian enterprises curtailed production in conjunction with the decrease in demand on the domestic and international markets. The major enterprises producing tungsten concentrate were the Lermontovo, the Novo Orlovsk, and the OAO Primorsk mining and beneficiation complexes, and the Kvarts Artel. The major portion of tungsten concentrate was processed in the Kabardino-Balkariya Republic at the Gidrometallurg plant, and a lesser amount was produced at the Pobedit plant in Vladikavkaz. In 2009, both plants experienced serious economic difficulties (Podvishenskiy and others, 2010).

The leading enterprise that produced tungsten concentrate was Primorsk, which in 2009 operated at a loss. Production of tungsten concentrate at Primorsk decreased by 23% compared with that of 2008, which was attributed to the decrease in price for tungsten and the decrease in global demand (Podvishenskiy and others, 2010).

The Lermontovo enterprise practically ceased production in 2009. The volume of tungsten concentrate production at the Kvartz Artel and the Novo Orlovsk complex increased by 10% compared with that of 2008. In 2009, these enterprises extracted 1,300 t of tungsten metal. Owing to the continued low prices for tungsten, however, these enterprises were not expected to increase output in 2010 (Podvishenskiy and others, 2010).

Russia exported 5,461 t of tungsten concentrate in 2009, which was 38.2% more than in 2008. China, which received 4,573 t, was the leading recipient of Russian tungsten concentrate. In 2009, Russia imported about 18 t of tungsten concentrate from Mongolia whereas in 2008, Russia imported 188 t, of which 112 t came from the Democratic Republic of the Congo [Congo (Kinshasa)]. In 2009, apparent domestic consumption of tungsten concentrate was 1,100 t (Podvishenskiy and others, 2010).

Production of tungsten concentrate in 2010 was planned to be about 7,300 t based on an expected increase in demand and in the price for tungsten. The short-term and medium-term outlooks for Russian tungsten concentrate production were dependent to a significant degree on increasing the amount of exploration and the amount of investment in the renovation of existing capacity. In planning for future tungsten production, not only was the low price of tungsten a factor, but so was the dominant role of China in the world tungsten market (Podvishenskiy and others, 2010).

Industrial Minerals

Diamond.—About 97% of Russia's diamond production was by the Almazy Rosii-Sakha JSC (Alrosa Company Ltd.). In 2009, Alrosa mined almost 32.8 million carats valued at $2,264,600,000 and was the world's leading diamond producer. Russia's estimated production (in carats) of gem and industrial diamond, however, decreased by 11% compared with that of 2008, and gem diamond output was estimated to have decreased by 19%. The value of output of gem diamond decreased more significantly than the physical output in carats. In 2010, Alrosa planned to increase production to 33.54 million carats (Brayko and Ivanov, 2010).

Phosphate Rock.—In Russia, the major source of phosphate raw material was apatite ore in the Khibiny massif and Kovdor deposit on the Kola Peninsula. The Khibiny apatite-nepheline ores contain about 90% of the country's apatite reserves and have a P_2O_5 content of 12% to 16%; the Kovdor ores contain about 6% of the country's reserves and have a P_2O_5 content of between 6% and 7%. Sedimentary phosphate rock containing about 6% P_2O_5 was mined primarily by the OAO Fosforit enterprise from the Kingisepp deposit. Fosforit produced a phosphate flour with a 28% P_2O_5 content. Fosforit was constructed with the capacity to mine 7 Mt/yr of ore, but owing to the lack of demand in the world market for phosphate flour, it had mothballed about one-half of its production capacity. The remaining phosphate flour was used domestically to produce complex fertilizers (Brylyakov and others, 2007).

In November, 2009, the OAO Apatit mining and chemical complex, which was the country's main supplier of phosphate raw material, completed 80 years of operation. The complex consisted of four mining enterprises, which included two underground mines and four open pits, and a beneficiation complex, which consisted of two beneficiation plants that had a combined capacity to produce 8 Mt/yr of apatite concentrate. In 2009, the Apatit complex employed 11,500 people. Development plans for the Apatit complex until 2020 called for apatite concentrate production to stabilize at 8 Mt/yr, which would fully supply the country's phosphate raw material needs. Achieving this plan would entail developing underground mining, which would account for 75% of the ore mined in 2020

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compared with 45% in 2005 owing to reserves being depleted at two open pits. Plans up to the year 2050 envisioned developing existing mines to maintain production levels beyond 2020 and developing new deposits, including the Eveslogchorr deposit (Shaposhnik, 2009; Svinin and others, 2009).

As of 2009, apatite reserves were reported in 10 apatite-nepheline deposits on the Kola Peninsula, of which 6 were under development. As of January 1, 2009, economic reserves (balansovye zapasy) (reported according to the reserve classification system Russia inherited from the Soviet Union) in the 10 apatite-nepheline deposits were reportedly about 3.56 Gt. The Apatit complex reportedly had economic reserves in categories A, B, and C1 of 2.13 Gt containing 320 Mt P_2O_5, of which 245 Gt containing 57 Gt P_2O_5 was considered suitable for open pit development and about 1.89 Gt containing 276 Mt P_2O_5 was considered suitable for underground mining. An additional 224 Gt of resources containing 29 Gt of P_2O_5 was reported in category P2. About 45% of the reserves of the Apatit complex was in categories A and B (Glubokiy, 2009).

Mineral Fuels and Related Materials

Coal.—In 2009, coal production decreased by 2.4% compared with that of 2008. Anthracite production decreased by about 6% to 6 Mt. Brown coal and lignite production decreased by about 16% to 69.3 Mt. Bituminous coal production increased by almost 3% and accounted for about 75% of total coal production. In 2009, about 35% of coal was produced by underground mining and 65% was produced by open pit mining (Federal'naya Sluzhba Gosudarstvennoy Statistiki, 2011a).

The leading thermal coal mining company in the country was OAO Sibirskaya ugol'naya energeticheskaya Kompaniya (SUEK), which mined approximately 90 Mt/yr of coal or about 36% of Russia's output. SUEK mined primarily brown coal. The leading producer of thermal hard coal was OAO Kuzbazugol', which mined 41 Mt/yr of thermal coal. Coking coal was mined at 10 enterprises, most of which were vertically integrated with metallurgical holding companies. The Russian market for coking coal was about 41.5 Mt/yr of coal concentrate. Coking coal production was concentrated in three production associations—the Evraz Group (which included the OAO Raspadskaya Mine), the Sibuglemet holding, and the OAO Ugol'naya kompaniya Yuzhniy Kuzbaz. These three associations accounted for 57% of the domestic open market for coking coal and mined between 70% and 80% of the most highly valued hard coals. Approximately 20% to 25% of the country's total coking coal output was exported. The leading exporters of coking coal were OAO Yakutugol' and Sibuglemet (Kontorovich and Churashev, 2009).

The basic growth in Russian coal production was expected to come from the Kuznetsk Basin, which was producing about 50% of the country's total coal output and 80% of the most highly valued coking coal used in metallurgy. About 40% of the coal produced in the Kuznetsk Basin was exported, which constituted about 80% of the country's total coal exports (Kontorovich and Churashev, 2009).

Two factors were inhibiting the development of the Russian coal industry. The first was the low domestic price for gas, which made coal-burning powerplants not competitive with those using gas. The second factor was that the majority of coal was mined in Siberia whereas the majority of coal was consumed in the European part of the country, which added significantly to the cost of using coal (Kontorovich and Churashev, 2009).

Russia, which ranked second in the world in coal reserves (reported according to the Russian reserve system), had 157 Gt of proven reserves and 4.45 Gt of prognosticated resources, of which 66% of the reserves and prognosticated resources were located in Siberia. According to estimates of the Siberian Branch of the Russian Academy of Sciences, coal output in the Siberian coal basins could be increased to between 350 and 400 Mt/yr if sufficient investment were made to develop production capacity and infrastructure (Kontorovich and Churashev, 2009).

Natural Gas.—According to the Oil and Gas Journal, Russia holds the world's largest natural gas reserves, with 1,680 trillion cubic feet (about 47.5 trillion cubic meters), and Russia's reserves account for about one-quarter of the world's total proven reserves. The majority of these reserves are located in the western Siberia economic region at the Medvezh'ye, the Urengoy, and the Yamburg fields, which account for about 45% of Russia's total reserves. In 2009, Russia ranked second in the world following the United States as a natural gas producer (with output of about 584 billion cubic meters), but Russia was the world's leading gas exporter [7.3 trillion cubic feet (about 207 billion cubic meters)] (U.S. Energy Information Administration, 2010).

In 2009, Russia's natural gas production decreased by almost 12% compared with that of 2008, and Russia's natural gas exports also decreased. The country's leading gas producing company was OAO Gazprom, which was also the world's leading natural gas producing company. Although Gazprom was partially privatized, the Russian Government held the controlling stake. Gazprom's major producing fields were located in the Yamalo-Nenetskiy Avtonomnyy Okrug in West Siberia. Gazprom was developing gasfields on the Yamal Peninsula in West Siberia, which it expected to become the company's main gas producing region (U.S. Energy Information Administration, 2010).

The Medvezhye, the Urengoy, and the Yamburg gasfields, which were the country's leading gas producing fields, had decreasing output in recent years. In response, in late 2008, the Yamal megaproject was launched to develop gas deposits on the Yamal Peninsula in West Siberia. In addition, the Zapolyarnyy field, which was commissioned in 2001, was expected to offset some of the declines at Gazprom's leading three producing fields. Preparations also were underway by Gazprom for the development of Shtokman field offshore in the Barents Sea. The Shtokman project would become a resource base for Russia to export gas to Europe through the Nord Stream pipeline (U.S. Energy Information Administration, 2010; OAO Gazprom, 2011a).

Gazprom possessed the largest gas transmission system in the world, which included 159,500 km of gas trunk lines. The company was engaged in developing major new pipeline projects, which included the Nord Stream and South Stream pipelines (OAO Gazprom, 2011a). The Nord Stream pipeline would create a link with Russia's Baltic Sea coast near Vyborg

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to Germany's Baltic Sea coast in the vicinity of Greifswald. The pipeline would be 1,224 km in length. Gas supplies shipped through the Nord Stream pipeline would go to Denmark, France, Germany, the Netherlands, the United Kingdom, and other countries (OAO Gazprom, 2011b). The South Stream project was planned to include a section that would lie under the Black Sea from the Russkaya compressor station on the Russian coast to the Bulgarian coast. The total length of the offshore section would be about 900 km and would be at a maximum depth of more than 2 km. To provide the required amount of gas to the South Stream pipeline, gas transmission system capacities in Russia would need to be expanded. A pre-investment feasibility study for this pipeline was being conducted (OAO Gazprom, 2011c).

In Russia, natural gas associated with oil production was often flared. According to the U.S. National Oceanic and Atmospheric Administration, Russia flared an estimated 1,432 billion cubic feet (about 40.4 billion cubic meters) of natural gas in 2008, which was the largest amount of gas flared by any country in the world. The Russian Government was attempting to reduce gas flaring and had set a target for 95% utilization of associated gas by 2012 (U.S. Energy Information Administration, 2010).

Petroleum.—In 2009, Russia increased crude oil production, mainly owing to the development of new oil and gas projects in East Siberia in the Timan-Pechora oil and gas province and on Sakhalin Island (Korzhubayev and Eder, 2010). The largest increases in production in 2009 compared with 2008 occurred at the following companies: OAO Rosneft', 2.4 Mt; OAO Lukoil, 1.9 Mt; OAO TNK-BP, 1.4 Mt, and OAO Bashneft, 0.5 Mt (Korzhubayev and Eder, 2010).

Russia was facing difficulties in maintaining or increasing production levels because from 1994 to 2009 the extraction of oil had exceeded the growth in reserves by 1.2 Gt. In 2009, the growth in oil reserves, however, exceeded production and totaled 620 Mt, which was only the second year that the growth in reserves had exceeded production between 1994 and 2009 (the first time by a very small amount in 2008), and the first significant growth in reserves exceeding production. The growth in reserves occurred primarily in the Vankorskoye and adjacent deposits in Krasnoyarskiy Kray in East Siberia. In previous years, growth in reserves had taken place primarily at existing deposits rather than as a result of exploration of new deposits. Growth in reserves corresponded with a growth in exploration expenditures, which in 2008 were 3.7 times as great as in 2001 in real ruble value, although expenditures for exploration for oil and gas decreased by about 12% in 2009 (Korzhubayev and Eder, 2010).

The major area for Russian oil production was in West Siberia. In 2009, production in West Siberia was 322.8 Mt, which was a 2.8% decrease compared with that of 2008. In 2009, the Khanty-Mansiyskiy Avtonomnyy Okrug, which was the leading oil producing region in West Siberia, produced 270 Mt, or 84% of production in West Siberia. Growth in production in West Siberia happened at a new project to develop the Salymskaya group of deposits, where production in 2009 reached a peak level of 7.7 Mt, which was 20% more than in 2008.

In the Yamalo-Nenetksiy Avtonomnyy Okrug, which was the second-ranked producing region in West Siberia, production had been decreasing since 2005, and had decreased by 34% to 35 Mt in 2009 from 53.3 Mt in 2004. Large-scale production in West Siberia also took place in Tomskaya Oblast', where production, after having fallen in 2005 and 2006, had stabilized from 2007 to 2009 at between 10.2 and 10.6 Mt/yr. The most prospective area for new production in western Siberia was in the south of Tyumenskaya Oblast' at the Uvatskiye group of deposits, where production was 2 Mt in 2008 and by 2010 was planned to increase to 4 Mt (Korzhubayev and Eder, 2010).

About 30% of Russia's oil production in 2009 took place in the European part of the country where production reached 148.5 Mt, which was 4.9% greater than in 2008. The major volume of oil production was in the Povolzh'ye (along the Volga) region, which in 2009 produced 61.9 Mt mainly from the traditional producing areas of the Republics of Tatarstan (32.9 Mt) and Bashkortostan (11.4 Mt), and Samarskaya Oblast' (11.8 Mt). Production in the Povolzh'ye region had been increasing at the rate of 3% to 4% per year despite decreasing levels of extraction. Increased production was the result of increased recovery levels because of the use of state-of-the-art technology and also because of bringing small deposits of high-viscosity oil into production (Korzhubayev and Eder, 2010).

The second ranked producing region in the European part of the country was in the Ural Mountains region where production in 2009 was 45.3 Mt, which was 4.7% more than in 2008. One of the most dynamic areas in the European part of the country for oil and gas development was in the Timan-Pechora oil and gas province, where oil production in 2009 was 31.6 Mt (Korzhubayev and Eder, 2010).

In East Siberia, the volume of oil production was increasing rapidly. In 2009, oil extraction totaled 7.5 Mt, which was a fivefold increase compared with output in 2008. Oil extraction in East Siberia was taking place in Irkutskaya Oblast', Krasnoyarskiy Kray, and the Sakha (Yakutiya) Republic. Oil production in the Russian Far East (on Sakhalin Island) totaled 15.363 Mt and was projected to increase (Korzhubayev and Eder, 2010).

Uranium.—In Russia, uranium mining and processing was conducted by enterprises, which included JSC Dalur in the Kurgan region, JSC Khiagda in the Republic of Buryatiya, and JSC Priargunsky Industrial Mining and Chemical Union in Zabaykal'skiy Kray. Priargunsky mined uranium by underground methods, and the other two enterprises employed in situ leaching (Corporation TVEL, 2009).

Russia had plans to increase electric power generation from nuclear powerplants to 360 billion kilowatthours in 2020 from 155 billion kilowatthours in 2006. The country was facing difficulties in securing its uranium supply, however. Existing stocks of uranium stored in warehouses were being depleted, and the country did not have a sufficient quantity of uranium deposits slated for development to meet domestic demand. In 2009, the country consumed about 15,000 t of uranium, whereas uranium extraction was less than 3,600 t. Growth in uranium demand was expected to far outstrip domestic supply from existing mining enterprises (Corporation TVEL, 2009).

Russian uranium reserves were assessed to be 650,000 t, of which 70% was in the reserve category C2, which was the lowest category considered to be reliably verified according

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to the reserve classification system that was used in the Soviet Union and then Russia. Russia also had 830,000 t of uranium resources in categories P1 and P2, which were termed prognosticated resources (Bablov and Mashkovtsev, 2009).

To secure Russia's future uranium supply, the country created a plan that called for increasing production at existing enterprises and for the development of new deposits. The country's total demand for uranium was forecasted to grow to 36,000 t/yr by 2020. By 2020, Russia planned to increase uranium mining to 28,800 t/yr. Production at Priargunsky was projected to increase to 5,000 t/yr; at Khiagda, to 2,000 t/yr; and at Dalur, to between 1,000 and 1,500 t/yr. The Elkonsky group of deposits would be developed to provide an additional 5,000 t/yr of uranium. The remainder was planned to be mined at new uranium deposits in Buryatiya and Zabaykal'skiy Kray, as well as at new joint ventures abroad. Not only Russian deposits, but also deposits of other countries, including Kazakhstan, Ukraine, and Uzbekistan, were expected be used to meet Russia's demand for uranium (Corporation TVEL, 2009).

Priargunsky could increase uranium production by more than 50% to 5,000 t/yr by 2014-15. Plans called for Priargunsky to develop the Sixth and Eighth Mines. The Sixth Mine would be the main source of uranium and was projected to produce 1,000 t/yr; the Eighth Mine was projected to produce 800 t/yr. With production from these two mines, Priargunsky could produce 5,000 t/yr. It would require considerable investment to commission these new mines and also to implement associated measures to protect the environment (Interfax Russia & CIS Metals and Mining Weekly, 2007).

In 2008, JSC Atomredmetzoloto (ARMZ Uranium Holding Co.) consolidated under its control all uranium mines in Russia and Russian uranium mining assets abroad. ARMZ planned to meet certain goals, which included technologically upgrading and developing operating uranium mining enterprises, prospecting for uranium, and creating uranium mining ventures in countries of the Commonwealth of Independent States and other countries [Corporation TVEL, 2009; JSC Atomredmetzoloto (ARMZ Uranium Holding Co.), 2011].

Outlook

Although Russia reportedly has adequate resources of most minerals to provide for the needs of its domestic enterprises and to maintain its level of exports for the near future, the country is facing a number of longer term issues in ensuring the continued development of its mineral resources. These issues include the fact that the growth in production of minerals is exceeding the growth in discovery of reserves of these minerals. Expenditures on exploration would have to be increased, as current levels are not adequate to discover needed new deposits. Remaining reserves of nonfuel minerals are often characterized by low ore grades and for fuel minerals by the small size of deposits, and remaining reserves of fuel and nonfuel are located in difficult to access regions. It was also going to be necessary to develop technologies to extract a range of useful byproducts found in low concentrations in nonfuel mineral ores along with the main minerals being developed and to develop technologies to lessen the losses of nonfuel minerals during mining (Kleshchev and others, 2009; Vercheba, 2009).

References Cited

Bablov, V.N., and Mashkovtsev, G.A., 2009, Sostoyanie i puti razvitiya mineral'no-syr'yevoy bazy urana Rossii [The condition of and paths for the development of Russia's mineral resource base of uranium]: Gornyy Zhurnal [Mining Journal], no. 3, p. 57-61.

Brayko, V.N., and Ivanov, V.N., 2010, Analyz itogov raboty otrasli po dobyche i proizvodstvu dragotsennykh metallov I dragotsennykh kamney v 2009 g i prognoz ee razvitiya na blizhayshiye gody [Analysis of the results of the work of the branch for the mining and production of precious metals and precious stones in 2009 and the prognosis for their development in coming years]: Mineral'nye Resursy Rossii—Ekonomika i Upravlniye [Mineral Resources of Russia—Economics and Management], no. 3, p. 59-78.

Brylyakov, Yu.E., Gershenkop, A.Sh., and Lygach, V.N., 2007, Sovremennoye sostoyanie I osnovnye napravleniya razvitiya tekhnologii glubokoy I kompleksnoye pererabotki fosforsoderzhashchikh rud [Current state and basic directions for the development of technology for the deep and complex processing of phosphorus containing ores]: Gornyy Zhurnal [Mining Journal], no. 2, p. 30-38.

Chanturiya, V.A., 2007, Perspektivy ustoycivogo razvitiya gornopererabatyvayushchiy industrii Rossii [Perspectives for the sustainable development of Russia's mining and processing industry]: Gornyy Zhurnal [Mining Journal], no. 2, p. 2-9.

Corporation TVEL, 2009, JSC UMC: Corporation TVEL (Accessed April 17, 2009, at http://www.tvel.ru/en/corporations_enterprises/sp_ukrtvs/umc.)

Federal'naya Sluzhba Gosudarstvennoy Statistiki [Federal State Statistical Service], 2011a, Dobycha poleznykh iskopayemykh [Mineral mining]: Rossiyskiy Statisticheskiy Yezhegodnik [Statistical Yearbook 2010]. (Accessed April 11, 2011, at http://udbstat.eastview.com/catalog/readbook.jsp?issue=1109568.)

Federal'naya Sluzhba Gosudarstvennoy Statistiki [Federal State Statistical Service], 2011b, Export and import—The Russian Federation: Rossiyskiy Statisticheskiy Yezhegodnik [Statistical Yearbook 2010]. (Accessed March 20, 2011, at http://www.gks.ru/bgd/regl/b10_13/IssWWW.exe/Stg/d6/25-04.htm.)

Federal'naya Sluzhba Gosudarstvennoy Statistiki [Federal State Statistical Service], 2011c, Indeksy proizvodstva po otdel'nhym vidam ekonomicheskoy deyatel'nosti [Indices of production by separate types of economic activity]: Rossiyskiy Statisticheskiy Yezhegodnik [Statistical Yearbook 2010]. (Accessed April 11, 2011, at http://udbstat.eastview.com/catalog/readbook.jsp?issue=1109568.)

Federal'naya Sluzhba Gosudarstvennoy Statistiki [Federal State Statistical Service], 2011d, Production account by economic activity (at current prices, million): Rossiyskiy Statisticheskiy Yezhegodnik [Statistical Yearbook 2010]. (Accessed March 29, 2011, at http://www.gks.ru/bgd/regl/b10_13/IssWWW.exe/Stg/d3/11-09-2.htm.)

Federal'naya Sluzhba Gosudarstvennoy Statistiki [Federal State Statistical Service], 2011e, Raspredeleniye geologorazvedochnykkh rabot po vidam poleznykh iskopeamykh—v protsentov [Distribution of geologic exploration work by types of minerals—In percent]: Rossiyskiy Statisticheskiy Yezhegodnik [Statistical Yearbook 2010]. (Accessed April 11, 2011, at http://udbstat.eastview.com/catalog/readbook.jsp?issue=1109568.)

Federal'naya Sluzhba Gosudarstvennoy Statistiki [Federal State Statistical Service], 2011f, Rossiya v tsifrakh [Russia in figures]—Annual average capacity of organizations for production of selected products: Federal'naya Sluzhba Gosudarstvennoy Statistiki [Federal State Statistical Service]. (Accessed March 19, 2011, at http://www.gks.ru/bgd/regl/b10_12/IssWWW.exe/Stg/d02/14-04.htm.)

Federal'naya Sluzhba Gosudarstvennoy Statistiki [Federal State Statistical Service], 2011g, Rossiya v tsifrakh [Russia in figures]—Basic indicators of mining and quarrying, manufacturing, electricity, gas and water production and supply: Federal'naya Sluzhba Gosudarstvennoy Statistiki [Federal State Statistical Service]. (Accessed March 19, 2011, at http://www.gks.ru/bgd/regl/b11_12/IssWWW.exe/stg/d01/14-01.htm.)

Federal'naya Sluzhba Gosudarstvennoy Statistiki [Federal State Statistical Service], 2011h, Rossiya v tsifrakh [Russia in figures]—Schet Proizvodstva po vidam ekonomicheskoy deyaterl'nosti) [Russia in figures—Calculation of economic activity by type]: Federal'naya Sluzhba Gosudarstvennoy Statistiki [Federal State Statistical Service]. (Accessed March 19, 2011, at http://www.gks.ru/bgd/regl/b10_12/IssWWW.exe/Stg/d02/14-02.htm.)

Digitized by Google

Federal'naya Sluzhba Gosudarstvennoy Statistiki [Federal State Statistical Service], 2011i, Selected indicators of types of economic activities: Rossiyskiy Statisticheskiy Yezhegodnik [Statistical Yearbook 2010] (Accessed March 20, 2011, at http://www.gks.ru/bgd/regl/b10_13/IssWWW.exe/Stg/d3/13-01.htm.)

Federal'naya Sluzhba Gosudarstvennoy Statistiki [Federal State Statistical Service], 2011j, Srednegodoya chislennost' rabotinikov organizatisiy—tys. Chelovek: Promyslennost Rossii 2010 [Industry of Russia 2010], p. 34. (Accessed April 11, 2011, at http://udbstat.eastview.com/catalog/readbook.jsp?issue=1121979.)

Global Information, Inc., 2007, Market research report—Materials for electronics in CIS—Gallium and indium: Global Information, Inc. (Accessed January 8, 2010, at http://www.the-infoshop.com/report/info42697-gallium.html.)

Glubokiy, S.S., 2009, Otsenka zapasov apatit-nefelinovykh rud [Evaluation of reserves of apatite-nepheline ores]: Gornyy Zhurnal [Mining Journal], no. 9, p. 22-24.

Interfax Russia & CIS Metals and Mining Weekly, 2007, Priargun to boost urnanium production more than 60% in 2014-2015: Interfax Russia & CIS Metals and Mining Weekly, issue 22, May 25-31, p. 18.

Interfax Russia & CIS Metals and Mining Weekly, 2008, Resource Ministry to unveil federal deposit list in Dec: Interfax Russia & CIS Metals and Mining Weekly, v. 18, issue 48, November 28-December 4, p. 19, 20.

Interfax Russia & CIS Metals and Mining Weekly, 2009, Barrick to decide on PGM project launch soon: Russia & CIS Metals and Mining Weekly, issue 7, February 20-26, p. 8.

JSC Atomredmetzoloto (ARMZ Uranium Holding Co.), 2011, About company: JSC Atomredmetzoloto (ARMZ Uranium Holding Co.). (Accessed November 24, 2011, at http://www.armz.ru/eng/company/strategy.)

Katunin, V.V., 2010, Osnovnye pokazateli raboty chernoy metallurgi Rossii v 2009 g [Basic indicators of the work of ferrous metallurgy in Russia in 2009]: Chernaya Metallurgiya [Ferrous Metallurgy], no. 3, p. 5-13.

Kleshchev, K.A., Lodzhevskaya, M.I., and Golov, A.A., 2009, Osnovnye pokazateli sostoyaniya toplivno-energeticheskogo kompleksa stran—proizvoditeley nefti i gaza [Basic indicators of the condition of the fuel-energy complex of countries—Producers of oil and gas]: Gornyy Zhurnal [Mining Journal], no. 3, p. 18-24.

Kontorovich, A.E., and Churashev,V.N., 2009, Perspecktivy razvitiya ugol'noy promyshlennosti Rossii [Perspective development of Russia's coal industry]: Mineral'nye Resursy Rossii—Ekonomika i Upravlniye [Mineral Resources of Russia—Economics and Management], no. 1, p. 33-40.

Korzhubayev, A.G., and Eder, L.V., 2010, Neftyanaya promyshlennost' Rossii—itogi 2009 g [Russia's oil industry—2009 results]: Mineral'nye Resursy Rossii—Ekonomika i Upravlenie [Mineral Resources of Russia—Economics and Management], no. 3, p. 48-57.

Kremnetskiy, A.A., Usova, T. Yu., and Levchenko, Ye., N., 2009, Sostoyaniye, problemy, i puti razvitiya mineral'no-syr'yevoy bazy redkikh metallov [The condition, problems, and ways to develop the mineral raw-material base for rare metals], Rudy i Metaly [Ores and Metals], no. 1, p. 38-44.

Kuck, P.H., 2011, Nickel: U.S. Geological Survey Mineral Commodity Summaries 2011, p. 108-109.

Kul'chitskiy, N.A., and Naumov, A.V., 2010a, O sovremennom sostoyanii rynka selena i soedineniy na ego osnove [About the current condition of the market for selenium and compounds based on it]: Tsvetnaya Metallurgiya [Nonferrous Metallurgy], no. 4, p. 37-44.

Kul'chitskiy, N.A., and Naumov, A.V., 2010b, Obzor mirovykh rynkov kadmiya, tellura, i soedineniy na ikh osnove [Overview of the world market for cadmium, tellurium, and compounds based on them]: Tsvetnay Metallurgiya [Nonferrous Metallurgy], no. 2, p. 31-44.

Kurkov, A.V., and Kotova, V.M., 2007, Sovremennoye sostoyaniye I osnovnye napravleniya razvitiya protsessov glubokoy I kompleksnoy pererabotki redkometallicheskogo syr'ya [Current state and basic directions for the development of processes for the deep and complex processing of rare metal ores]: Gornyy Zhurnal [Mining Journal], no. 2, p. 72-77.

Linyev, B.I., Deberdeyev, I.Kh., and Davydov, M.V., 2007, Sovremennoye sostoyeniye i osnovnye napravleniya razvitiya tekhniki i tekhonologii glubokogo obogshcheniya uglya [The current state and basic directions of the development of the technique and technology for deep processing of coal]: Gornyy Zhural [Mining Journal], no. 2, p. 23-29.

Loferski, P.J., 2011, Platinum-group metals: U.S. Geological Survey Mineral Commodity Summaries 2011, p. 120-121.

Mashkovtsev, G.A., Korotkov, V.V., Pechenkin, I.G., Pokalov, V.T., and Pogozhin, A.A., 2009, Sostoyaniye, problemy in puti razvitiya mineral'no-syr'yevoy bazy chernykh I legiruyushikh metallov [The condition, problems and ways to develop the mineral raw-material base of ferrous and alloying metals): Rudy I Metally [Ores and Metals], no. 1, p. 29-32.

Naumov, A.V., 2009, Izmeneniya na rynke indiya v 2001-2009 g [Changes in the indium market for the years 2001-2009]: Tsvetnaya Metallurgiay [Nonferrous Metallurgy], no. 12.

Naumov, A.V., 2010, Rynok "malykh metallov" v Rossii—krizis I ego posledtviya [The market for "lesser metals" in Russia—The crisis and its consequences]. Tsvetnaya Metallurgiya [Nonferrous Metallurgy], no. 1, p. 38-43.

OAO Gazprom, 2011a, Gazprom today: OAO Gazprom. (Accessed April 10, 2011, at http://www.gazprom.com/about/today/.)

OAO Gazprom, 2011b, Nordstream: OAO Gazprom. (Accessed April 10, 2011, at http://www.gazprom.com/production/projects/pipelines/nord-stream/.)

OAO Gazprom, 2011c, South Stream: OAO Gazprom. (Accessed April 10, 2011, at http://www.gazprom.com/production/projects/pipelines/south-stream.)

OJSC Germanium, 2010a, About us: OJSC Germanium. (Accessed August 29, 2010, at http://www.krasgermanium.com/about.)

OJSC Germanium, 2010b, Home: OJSC Germanium. (Accessed August 29, 2010, at http://www.krasgermanium.com/home.)

OJSC Germanium, 2010c, Products: OJSC Germanium. (Accessed August 29, 2010, at http://www.krasgermanium.com/products.)

OJSC Germanium, 2010d, Quality control: OJSC Germanium. (Accessed August 29, 2010, at http://www.krasgermanium.com/quality.)

OJSC Germanium, 2010e, Technology: OJSC Germanium. (Accessed August 29, 2010, at http://www.krasgermanium.com/technology.)

OJSC Mining and Metallurgical Company (MMC) Norilsk Nickel, 2010a, Annual report 2009: OJSC Mining and Metallurgical Company (MMC) Norilsk Nickel, 256 p. (Accessed March 28, 2011, at http://www.nornik.ru/_upload/year2009/en/Chapter_4_Endf.)

OJSC Mining and Metallurgical Company (MMC) Norilsk Nickel, 2010b, Mineral reserves and resource statement: OJSC Mining and Metallurgical Company (MMC) Norilsk Nickel. (Accessed February 10, 2010, at http://www.nornik.ru/en/our_products/MineralReservesResourcesStatement.)

OJSC Mining and Metallurgical Company (MMC) Norilsk Nickel, 2011, Fact sheet: OJSC Mining and Metallurgical Company (MMC) Norilsk Nickel. (Accessed March 28, 2011, at http://www.nornik.ru/en/investor/fact.)

Podvishenskiy, S.N., Teslitskaya, M.V., and Ryuchina, G.V., 2010, Sostoyaniye i tendentsii razvitiya mirovogo i rossiyskogo rynkov osnovnykh tsvetnykh metallov (alyuminiy, med', nikel', I dr.) v 2009 g—Prognoz no 2010-2011 [Condition and tendencies for the development of the world and Russian markets for basic nonferrous metals (aluminum, copper, nickel, and others], *in* 2009—The prognosis for 2010-2011]: Tsvetnaya Metallurgiya [Nonferrous Metallurgy], no. 8-9, p. 55-88.

Shaposhnik, Yu.P., 2009, OAO "Apatit"—80 let v avgardye gorno-khimicheskoy promyshlennisti Rossii [OAO Apatit—80 years in the avantgarde of the Russia mining-chemical industry]: Gornyy Zhurnal [Mining Journal], no. 9, p. 17-22.

Svinin, V.S., Zvonar', A.Yu., and Zaporozhets, V.Yu., 2009, Strategicheskoye planirovaniye—osnova stabil'nosti raboty predpriyatiya [Strategic planning—The basis for the stable working of the enterprise]: Gornyy Zhurnal [Mining Journal], no. 9, p. 17-22.

United Company RUSAL, 2010a, Annual report 2009: United Company RUSAL, 258 p. (Accessed April 3, 2011 at http://www.rusal.ru/en/annual_reports.aspx.)

United Company RUSAL, 2010b, RUSAL announces full year production results for 2009: United Company RUSAL, February 24. (Accessed March 31, 2011, at http://www.rusal.ru/en/news_details.aspx?id=6681.)

U.S. Energy Information Administration, 2010, Russia: U.S. Energy Information Administration country analysis brief, November. (Accessed April 26, 2011, at http://www.eia.doe.gov/cabs/russia/pdf.pdf.)

Vercheba, A.A., 2009, Problemy osvoeniya mineral'no-syr'yevoy bazy tverdykh poleznyh iskopaemykh Rossii [Problems in securing the mineral-raw material base of Russian hard minerals]: Gornyy Zhurnal [Mining Journal], no. 3, p. 25-29.

Vereschagin, Yu.A., Kudrevaykh, N.V., Malygin, M.A., and Emelina, T.N., 2006, Rare-earth magnets in Russia—Raw materials, processing, properties control and output issues, *in* Yang Luo and Wei Li, eds., Proceedings of the 19th International Workshop on Rare Earth Permanent Magnets & their Applications, Beijing, China, August 30-September 2, 2006: Journal of Iron and Steel Research, International, v. 13, supplement 1, 499 p.

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TABLE I

RUSSIA: PRODUCTION OF MINERAL COMMODITIES[1,2]

(Metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008	2009
METALS						
Aluminum:						
Ore and concentrate:						
Alumina	thousand metric tons	3,259	3,265	3,333 r	3,112 r	2,794
Bauxite		5,000,000 r,e	6,300,000 r	5,775,000 r	5,675,000 r	5,775,000
Nepheline concentrate, 25% to 30%e		1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Metal, smelter, primary		3,647,072	3,717,907	3,955,417	4,190,000 r	3,815,000
Antimony, mine output, recoverable Sb contente		3,000	3,500	3,500	3,500	3,500
Arsenic, whitee		1,500	1,800	1,500	1,500	1,500
Bismuth:e						
Mine output, Bi content		50	55	55	70	65
Metal, refined		10	11	12	13	12
Cadmium, metal, smelter		621	690	810	800	700 e
Chromium, chrome ore, marketable		772,000	966,065	776,681	913,000 r	416,194
Cobalt:e						
Mine output, recoverable Co content		6,300	6,300	6,300	6,200	6,100
Metal, refined		5,000	5,000	3,800	2,500	2,352 3
Copper:						
Ore, recoverable Cu contente		700,000	725,000	740,000	750,000	825,000
Metal:						
Blister, smelter:e						
Primary		696,000	635,000	650,000	630,000	625,000
Secondary		262,000	312,000	290,000	235,000	235,000
Total		958,000	947,000	940,000	865,000	860,000
Refined:						
Primary		684,000	635,000	650,000	610,000	605,000
Secondary		249,000	312,000	289,000	250,000	250,000 e
Total		933,000	947,000	939,000	860,000	855,000
Gallium[e]		10	11	11	11	11
Gold:						
Mine output, Au content	kilograms	164,186	159,340	156,975	172,031 r	190,693
Secondary recovery	do.	4,884	4,981	5,867	8,140	3,367
Indium[e]		10 r	10 r	10 r	10 r	4
Iron and steel:						
Iron ore:						
Gross weight		96,764,400	102,000,000	105,000,000	99,900,000	92,000,000
Fe content, 55% to 63%e		56,100,000	59,100,000	60,800,000	57,800,000	53,200,000
Metal:						
Pig iron		49,175,000	51,683,000	51,523,000	48,300,000	43,930,000
Direct-reduced irone		3,340,000	3,340,000	4,000,000	4,000,000	4,000,000
Ferroalloys:e						
Blast furnace:						
Ferromanganese		110,000	130,000	120,000	110,000	100,000
Ferrophosphorus		3,500	3,500	3,500	3,500	3,000
Spiegeleisen		7,000	7,000	7,000	7,000	6,500
Electric furnace:						
Ferrochromium		578,000 3	600,000	570,000	490,000 r,e	378,000 3
Ferrochromiumsilicon		4,000	4,000	4,000	4,000	3,500
Ferronickel, gross weight:4						
High-nickel		12,900	11,330 3	14,020 3	14,000	17,489 3
Other		8,160	18,800	20,000	20,000	4,822 3
Ferroniobium (ferrocolumbium)		--	--	121	121	120

See footnotes at end of table.

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TABLE 1—Continued

RUSSIA: PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008	2009
METALS—Continued						
Iron and steel—Continued:						
Metal—Continued:						
Ferroalloys—Continued:[e]						
Electric furnace—Continued:						
Ferrosilicon		742,000 [3]	882,300 [3]	896,100 [3]	850,000	745,000
Ferrovanadium		12,880 [3]	11,000	12,000	12,000	11,500
Silicomanganese		48,000	40,000	40,000	40,000	35,000
Silicon metal		58,000	54,500	54,000	54,000	54,000
Other		22,000	22,000	22,000	22,000	20,000
Total, ferroalloys		1,610,000	1,780,000	1,760,000	1,630,000 [r]	1,380,000
Steel:						
Crude		66,186,200	70,816,000	72,370,000	68,711,000 [r]	59,166,000
Finished, rolled		54,600,000	58,200,000	59,660,000	56,564,000	50,846,000
Pipe		6,673,000	7,898,400	8,706,000	7,772,000 [r]	6,655,000
Lead:[e]						
Mine output, recoverable Pb content		36,400	34,000	50,000	60,000	70,000
Metal, refined, primary and secondary		66,000	78,000	94,000	80,000	73,000
Magnesium:[e]						
Magnesite		930,000	1,200,000	1,200,000	1,200,000	1,000,000
Metal, including secondary		45,000	35,000	37,000	37,000	37,000
Manganese ore:[e]						
Gross weight		8,000	12,000	44,000	45,000	45,000
Mn content		1,600	2,400	9,000	9,200	9,200
Mercury[e]		50	50	50	50	50
Molybdenum, in concentrate[e]		3,000	3,100	3,300	3,600	3,800
Nickel:						
Marketable mine production, Ni content:						
Laterite ore		34,419	37,754	45,690	36,807 [r]	32,359
Sulfide concentrate		242,758	239,231	234,083	230,000 [r]	229,493
Total		277,177	276,985	279,773	266,807 [r]	261,852
Matte, for export		700	1,300	670 [e]	600 [e]	240 [e]
Nickel products:						
Ferronickel:						
High-nickel		12,600	14,436 [r]	17,111 [r]	16,158 [r]	15,565
Other		5,396 [r]	9,738 [r]	12,710 [r]	16,051 [r]	3,600
Metal		249,479 [r]	255,045 [r]	248,363 [r]	242,409 [r]	237,270
Oxide sinter		4,075	2,713	235	-- [r]	--
Chemicals		3,200 [r]	3,500 [r]	3,100 [r]	2,900 [r]	2,700
Total		274,750 [r]	285,432 [r]	281,519 [r]	277,518 [r]	259,135
Niobium (columbium)		NA [r]	NA [r]	NA [r]	NA [r]	NA
Platinum-group metals:[e]						
Platinum	kilograms	29,000	29,000	27,000	23,000	21,000
Palladium	do.	97,400	98,400	96,800	87,700	83,200 [3]
Other	do.	15,500	15,600	14,500	12,500	11,900
Total	do.	142,000	143,000	138,000	123,000	116,000
Rhenium[e]	do.	1,400	1,400	1,500	1,500	1,500
Selenium[e]	do.	100,000	110,000	120,000 [r]	130,000 [r]	140,000
Silicon[e]		525,000	600,000	635,000	640,000	640,000
Silver[e]						
Mine output, Ag content	kilograms	1,350,000 [3]	1,250,000	1,200,000	1,300,000	1,400,000
Secondary recovery	do.	265	265	265	265	265

See footnotes at end of table.

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TABLE 1—Continued

RUSSIA: PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008	2009
METALS—Continued						
Tin:[e]						
Mine output, recoverable Sn content		3,000	3,000	2,500	1,500	1,200
Metal, smelter:						
Primary		5,000	4,980	3,800	2,000	1,650
Secondary		500	500	400	300	300
Total		5,500	5,480	4,200	2,300	1,950
Titanium sponge[e]		29,560 [r]	32,170 [r]	34,150 [r]	34,950 [r]	26,600
Tungsten, concentrate, W content[e]		2,800	2,800	3,300	3,000	2,500
Vanadium, metal[e]		15,100	15,100	14,500	14,500	14,500
Zinc:[e]						
Mine output, recoverable Zn content		180,000	190,000	185,000	204,000	225,000
Metal, smelter, primary and secondary		220,000	240,000	260,000	260,000	225,000
Zirconium, baddeleyite concentrate, averaging 98% ZrO_2		6,700 [e]	7,500 [e]	7,136	7,000	5,000
INDUSTRIAL MINERALS						
Asbestos, grades I-VI[e]		925,000	925,000	1,025,000 [3]	1,017,000 [3]	1,000,000
Barite[e]		63,000 [r]	63,000	63,000	63,000	63,000
Boron[e]	thousand metric tons	400	400	400	400	400
Cement, hydraulic		48,500,000	54,700,000	59,900,000	53,600,000	44,300,000
Clays:						
Bentonite		NA [r]	NA [r]	NA [r]	NA [r]	NA
Kaolin concentrate[e]		45,000 [r]	45,000 [r]	45,000 [r]	45,000 [r]	45,000
Diamond:[e]						
Gem	carats	23,000,000	23,400,000	23,300,000	21,925,000 [3]	17,791,400 [3]
Industrial	do.	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000
Synthetic	do.	80,000,000	80,000,000	80,000,000	80,000,000	80,000,000
Total	do.	118,000,000	118,000,000	118,000,000	117,000,000	113,000,000
Feldspar[e]		45,000 [r]	45,000 [r]	45,000 [r]	45,000 [r]	45,000
Fluorspar, concentrate, 55% to 96.4% CaF_2[e]		245,500 [3]	210,000	180,000	269,000	240,000
Germanium		3	2	2	2 [e]	2 [e]
Graphite		14,000 [r]	14,000 [r]	14,000 [r]	14,000 [r]	14,000
Gypsum[e]		2,200,000	2,600,000 [r]	3,000,000 [r]	3,600,000 [r]	2,900,000 [3]
Iodine[e]		300,000	300,000	300,000	300,000	300,000
Lime, industrial and construction[e]		8,200,000	8,200,000	8,200,000	8,200,000	7,000,000
Mica[e]		100,000	100,000	100,000	100,000	100,000
Nitrogen, N content of ammonia		10,000,000	10,500,000	10,500,000 [e]	10,425,000	10,441,000
Perlite		NA [r]	NA [r]	NA [r]	NA [r]	NA
Phosphate rock:						
Gross weight[e]		11,317,400 [3]	10,866,000 [3]	11,400,000 [r]	10,400,000 [r]	10,000,000
P_2O_5 content:						
Apatite concentrate, 37% to 39.6%		4,210,000	4,040,000	4,120,000	3,800,000	3,650,000
Sedimentary rock, 19% to 30%		290,000 [r]	393,000 [r]	375,000 [r]	700,000 [r]	850,000 [e]
Total		4,500,000 [r]	4,433,000 [r]	4,495,000 [r]	4,500,000 [r]	4,500,000 [e]
Potash, marketable, K_2O equivalent		7,131,000	6,610,000 [e]	7,275,000	6,730,000	3,727,000
Salt, all types		2,700,000	2,800,000	2,200,000	2,200,000 [e]	2,200,000 [e]
Soda ash[e]		2,600,000	2,800,000	2,900,000	2,800,000	2,300,000
Sulfur:[e]						
Native		50,000	50,000	50,000	50,000	50,000
Pyrites		304,000	304,000	200,000	200,000	200,000
Byproduct:						
Metallurgy		640,000	695,000	800,000	820,000	820,000
Natural gas		6,301,000 [3]	6,346,000 [3]	6,000,000	6,100,000	6,000,000
Total, sulfur		7,300,000	7,400,000	7,050,000	7,170,000	7,070,000

See footnotes at end of table.

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TABLE 1—Continued

RUSSIA: PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008	2009
INDUSTRIAL MINERALS—Continued						
Sulfur, sulfuric acid		9,500,000 e	9,500,000 e	9,689,000	9,106,000	8,445,000
Talc[e]		160,000	160,000	170,000	160,000	160,000
Vermiculite[e]		25,000	25,000	25,000	25,000	25,000
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Anthracite	thousand metric tons	6,300	8,290	8,662	6,383 r	6,560
Bituminous	do.	202,913 r	202,128	209,216	216,049 r	222,042
Lignite	do.	73,668	74,148	71,143	82,530 r	68,158
Total	do.	282,881 r	284,566	289,021	304,962 r	296,760
Coke, metallurgical, 6% moisture content	do.	29,998	30,701	33,900 r	32,000	27,400
Natural gas, marketed	million cubic meters	640,612 r	656,016 r	653,000	663,000 r	583,610
Oil shale		1,200,000 r	1,200,000 r	1,200,000 r	1,200,000 r	1,200,000
Peat, fuel use		1,600,000	1,300,000	1,300,000	1,300,000	1,300,000 e
Petroleum:						
Crude in:						
Gravimetric units		469,600,000	480,484,000	491,000,000	488,105,000	494,000,000
Volumetric units[e]	thousand 42-gallon barrels	3,500,000	3,530,000	3,610,000	3,590,000	3,630,000
Refinery products[5]		208,000,000 r	219,575,000	229,000,000 r	237,000,000 r	236,000,000
Uranium:						
U content		3,431	3,262	3,413	3,521	3,564
U_3O_8 content		4,045	3,847	3,762	4,152	4,203

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. do. Ditto. NA Not available. -- Zero.

[1]In addition to the commodities listed, Russia produces a number of other mineral commodities, which include rare-earth metals concentrates, tantalum, and tellurium, but information is inadequate to estimate production.

[2]Table includes data available through January 31, 2011.

[3]Reported figure.

[4]In December 2001, Mechel OAO acquired a 79.9% interest in the South Urals Nickel Plant previously operated by Yuzhuralnikel Combine JSC. The new owner made substantial improvement to the Orsk ferronickel plant and produced a low-iron ferronickel (greater than 85% nickel). Excludes nickel-chromium remelt alloy produced from scrap. The remelt alloy typically has a nickel content of 20% to 50%.

[5]Not distributed by type and therefore not suitable for conversion to volumetric units. Data include all energy and nonenergy products but exclude losses.

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TABLE 2

RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit name	Annual capacity[e]
Alumina	Achinsk (United Company RUSAL)[2]	Achinsk	900,000
Do.	Bogoslovsk (United Company RUSAL)[2]	Krasnotur'insk	1,050,000
Do.	Boksitogorsk (United Company RUSAL)[2]	European north	200,000
Do.	Pikalyovo (United Company RUSAL)[2]	Pikalyovo	300,000
Do.	Uralsk (United Company RUSAL)[2]	Kamensk-Uralskiy	700,000
Aluminum, primary smelters	Bogoslovsk (United Company RUSAL)[2]	Krasnotur'insk	175,000
Do.	Bratsk (United Company RUSAL)[2]	Bratsk	950,000
Do.	Irkutsk (United Company RUSAL)[2]	Irkutskaya Oblast'	300,000
Do.	Kandalaksha (United Company RUSAL)[2]	Kola Peninsula	75,000
Do.	Khakas (United Company RUSAL)[2]	Khakasiya Republic	300,000
Do.	Krasnoyarsk (United Company RUSAL)[2]	Krasnoyarskiy Kray	875,000
Do.	Nadvoitsy (United Company RUSAL)[2]	Nadvoitsy, Kareliya Republic	75,000
Do.	Novokuznetsk (United Company RUSAL)[2]	Novokuznetsk	300,000
Do.	Sayansk (United Company RUSAL)[2]	Sayanogorsk	425,000
Do.	Uralsk (United Company RUSAL)[2]	Kamensk-Uralskiy	150,000
Do.	Volgograd (United Company RUSAL)[2]	Volgogradskaya Oblast'	175,000
Do.	Volkhov (United Company RUSAL)[2]	Volkhov, east of St. Petersburg	20,000
Amber	Kaliningrad Amber enterprise (Kaliningrad regional authorities and Alrosa Co. Ltd.)	Kaliningradskaya Oblast'	250
Antimony:			
Sb content of concentrate	Sarylakh deposit	Ust'-Nera region, Sakha (Yakutiya) Republic	6,000 [3]
Do.	Sentachan deposit	Northeastern Sakha (Yakutiya) Republic	NA
Compounds and metals	Ryazsvetmet plant	Ryazanskaya Oblast'	NA
Apatite, concentrate	Khibiny apatite association (OAO Apatit)	Kola Peninsula	15,000,000
Do.	Kovdor iron ore mining association	do.	700,000
Asbestos	Bazenovskoye chrysotile deposit	Sverdlovskaya Oblast'	NA
Do.	Molodeznoye deposit	Zabaykal'skiy Kray	NA
Do.	"Ogenburg Minerals" Co., Kiembaevskoye chrysotile deposit	Orenburgskaya Oblast'	500,000
Do.	Tuvaasbest complex	Tyva Republic	250,000
Do.	Uralasbest Mining and Ore Dressing Co.	Central Ural Mountains	1,100,000
Barite	Salarinskiy mining and beneficiation complex	Kvartsitovaya Sopka deposit	100,000
Bauxite	North-Urals mining company (United Company RUSAL)[2]	Severoural'sk region	3,400,000
Do.	South-Urals mining company (United Company RUSAL)[2]	Southern Ural Mountains	NA
Do.	Severnaya Onega Mine (United Company RUSAL)[2]	Northwest region	800,000
Do.	Komi Aluminum (United Company RUSAL)[2]	Sredne-Timan	2,500,000
Boron, boric acid	Bor Association	Primorskiy Kray	140,000
Do.	Amur River complex	Russian Far East	8,000
Do.	Alga River chemical complex	do.	12,000
Chromite	Saranov complex	Saranovskiy	200,000
Coal	Donets (east) Basin	Rostovskaya Oblast'	30,000,000
Do.	Kansk Achinsk Basin	East Siberia	50,000,000
Do.	Kuznetsk Basin (Kuzbass)	West Siberia	160,000,000
Do.	Moscow Basin	Moscow region	15,000,000
Do.	Neryungri Basin	Sakha (Yakutiya) Republic	15,000,000
Do.	Pechora Basin	Komi Republic	30,000,000
Do.	South Yakutiya Basin	Sakha (Yakutiya) Republic	17,000,000
Cobalt:	OJSC Mining and Metallurgical Company (MMC) Norilsk Nickel	Noril'sk region, Kola Peninsula	4,000
Do.	ZAO Rezh and OAO Yuzhuralnikel enterprises	Southern Ural Mountains	2,100

See footnotes at end of table.

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TABLE 2—Continued

RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

(Metric tons unless otherwise specified)

Commodity		Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity[e]
Cobalt—Continued		OAO Ufaleynikel (Industrial Metallurgical Holding)	Chelyabinsksya Oblast'	4,000
Do.		Khovu-Aksynskoe (nickel-cobalt) deposit	Khovu-Aksy, Tyva Republic	NA
Copper:				
Cu in ore		OJSC Mining and Metallurgical Company (MMC) Norilsk Nickel	Noril'sk region, Kola Peninsula	500,000
Do.		ZAO Russian Copper Co. (RMK)	Ural Mountains	70,000
Do.		Ural Mining and Metallurgical Co. (UMMC)	do.	230,000
Metal, refined		OJSC Mining and Metallurgical Company (MMC) Norilsk Nickel	Noril'sk region, Kola Peninsula	450,000
Do.		ZAO Russian Copper Co. (RCC)	Ural Mountains	170,000
Do.		Ural Mining and Metallurgical Co. (UMMC)	do.	360,000
Diamond, gem and industrial		Almazy Rossii-Sakha JSC (Alrosa Co. Ltd.) enterprises:	Sakha (Yakutiya) Republic, including:	
	thousand carats	Udachnyy mining and beneficiation complex	Zarnitsa and Udachnyy	NA
Do.	do.	Mirny mining and beneficiation complex	Mir and International	NA
Do.	do.	Aikhal mining and beneficiation complex	Aikhal and Komsomol'skiy	NA
Do.	do.	Anabaraskiy mining and beneficiation complex	Alluvial mines	NA
Do.	do.	Nyurbinskiy mining and beneficiation complex	Nyurbinskiy and Botuobinskiy	NA
Do.	do.	Lomonosov	Arkhangel'skaya Oblast'	NA
Feldspar		Kheto-Lanbino and Lupikko deposits	Kareliya Republic	NA
Ferroalloys		Kosaya Gora iron works	Kosaya, Gora	200,000
Do.		Kuznetsk ferroalloys plant	Novokuznetsk	400,000
Do.		Lipetsk iron and steel works	Lipetskaya Oblast'	NA
Do.		Serov ferroalloy plant	Sverdlovskaya Oblast'	NA
Do.		Chelyabinsk electrometallurgical plant	Chelyabinskaya Oblast'	450,000
Do.		Chusovoy iron and steel plant	Permskiy Kray	NA
Do.		Klyuchevsk ferroalloy plant	Dvurechensk	160,000
Ferromolybdenum		Sorsk ferromolybdenum plant [Strikeforce Mining and Resources Co. (SMR)]	Khakasiya Republic	NA
Do.		Zhireken ferromoybdenum plant [Strikeforce Mining and Resources Co. (SMR)]	East Transbaikal region	NA
Ferronickel		OAO Ufaleynikel	Chelyabinskaya Oblast'	5,000
Ferrovanadium		Vanadii-Tulachermet	Tula, North Caucasus	NA
Fluorspar		Abagaytuy deposit	Transbaikal	NA
Do.		Usugli Mine	do.	NA
Do.		Kyakhtinsky deposit	do.	NA
Do.		Kalanguy mining complex	Zabaykal'skiy Kray	NA
Do.		Yaroslavsky mining and beneficiation complex	Pogranichnoye and Vosnesenskoye deposits, Russian Far East's Primorskiy Kray	NA
Gallium		JSC Achinsk (United Company RUSAL)[2]	Achinsk in East Siberia	15
Do.		OOO Galliy	NA	NA
Do.		Novosibirsk tin complex	Novosibirsk	NA
Do.		JSC Pikalevo (United Company RUSAL)[2]	Pikalevo	NA
Germanium, metal and products		Federal State Unitary Enterprise Germanium	Kranoyarsk	7
Gold	kilograms	Mining companies:	Mining regions:	
		Amur a/s ZAO	Khabarovskiy Kray	5,500
Do.	do.	Buryatzoloto OAO	Buryatiya Republic	5,000
Do.	do.	Chukotka a/s	Chukotskiy Avtonmyy Okrug	1,700
Do.	do.	GRK Aldanzoloto OOO	Sakha (Yakutiya) Republic	4,000
Do.	do.	LT-Resurs, ZAO	Irkutskskaya Oblast'	2,700
Do.	do.	Neryungri-Metallik, OOO	Sakha (Yakutiya) Republic	1,500

See footnotes at end of table.

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TABLE 2—Continued

RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

(Metric tons unless otherwise specified)

Commodity		Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity[e]
Gold—Continued	kilograms	Mining companies—Continued:	Mining regions—Continued:	
		Nirungan, OOO	do.	1,100
Do.	do.	Omchak OAO	Magadanskaya Oblast'	3,000
Do.	do.	Omolonskaya ZRK, OAO	do.	5,000
Do.	do.	Omsukchanskaya GGK, ZAO	do.	3,000
Do.	do.	Oyna, a/s	Tyva Republic	1,500
Do.	do.	Pokrovskiy Mine OAO	Amurskaya Oblast'	6,000
Do.	do.	Polimetal, MNPO, OAO	Magadanskaya and Sverdlovskaya Oblast's, Khabarovskiy Kray	7,500
Do.	do.	Polyarnaya, a/s	Chukotskiy Avtonomnyy Okrug	1,000
Do.	do.	Polyus ZAO	Krasnoyarskiy Kray	38,000
Do.	do.	Priisk Drazhnyy, OOO	do.	1,200
Do.	do.	Priisk Solov'yevskiy, OAO	Amurskaya Oblast'	1,500
Do.	do.	Ros-DV, OOO	Khabarovskiy Kray	1,100
Do.	do.	Russdragmet OOO	Khabarovskiy Kray and Zabaykal'skiy Kray	6,000
Do.	do.	Seligdar, a/s	Sakha (Yakutiya) Republic	2,000
Do.	do.	Sovrudnik, OOO	Krasnoyarskiy Kray	2,000
Do.	do.	Susumanzoloto, OAO	Magadanskaya Oblast'	3,000
Do.	do.	Seligdar, a/s	Sakha (Yakutiya) Republic	2,000
Do.	do.	Sovrudnik, OOO	Krasnoyarskiy Kray	2,000
Do.	do.	Susumanzoloto, OAO	Magadanskaya Oblast'	3,000
Do.	do.	Uralelktomed', OAO	Sverdlovskaya Oblast'	1,400
Do.	do.	Vitim. a/s	Irkutskaya Oblast'	2,900
Do.	do.	Votok, a/s	Khabarovskiy Kray	1,100
Do.	do.	Yuzhuralzoloto	Chelyabinskaya Oblast'	4,200
Do.	do.	Zapadnaya, a/s	Krasnoyarskiy Kray	1,900
Do.	do.	Zolotaya, ZDK, ZAO	Khakasiya Republic	1,200
Indium:				
Primary		OAO Chelyabinsk electrolytic zinc plant	Chelyabinskaya Oblast'	6
Secondary		OAO Elektrotsink plant [Ural Mining and Metallurgical Co. (UMMC)]	Vladikavkaz, North Caucus	6
Iron ore		Kursk Magnetic Anomaly (KMA) region, which contains the following enterprises:	Locations:	50,000,000 [3]
		KMAruda	Korobkovskoye deposit	
		Lebedi and Stoilo	Gubkin	
		Mikhaylovka	Zheleznogorsk	
Do.		Northwest region, which contains the following enterprises:	Locations:	22,000,000 [3]
		Kostomuksha	Kostomuksha	
		Kovdor	Kola Peninsula	
		Olenegorsk	Olenegorsk	
Do.		Siberia region, which contains the following enterprises:	Locations:	18,000,000 [3]
		East:		
		Korshunovo	Zheleznogorsk	
		Rudnogorsk	Rudnogorsk	
		West:		
		Abakan	Abaza	
		Sheregesh	Sheregesh	
		Tashtagol	Tashtagol	
		Teya	Vershina Tei	

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TABLE 2—Continued
RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity[e]
Iron ore—Continued	Ural Mountains region, which contains the following enterprises:	Locations:	22,000,000 [3]
	Akkermanovka	Novotroitsk	
	Bakal	Bakal	
	Goroblagodat	Kushva	
	Kachkanar	Kachkanar	
	Magnitogorsk	Magnitogorsk	
	Peshchanka	Rudnichnyy	
Lead, metal	Dalpolimetal lead smelter	Rudnaya in the Primorskiy Kray	20,000
Do.	OAO Elektrotsink lead smelter [Ural Mining and Metallurgical Co. (UMMC)]	Vladikavkaz in North Caucasus	40,000
Lead-zinc, recoverable content of ore:			
Lead, recoverable Pb content of ore	Altay mining and beneficiation complex	Altayskiy Kray, South Siberia	2,000
Do.	Dalpolimetal mining and beneficiation complex	Primorskiy Kray	20,000
Do.	Nerchinsk polymetallic complex	Zabaykal'skiy Kray	7,000
Do.	Sadon lead-zinc complex	Severnaya Osetiya-Alaniya Republic	5,000
Do.	Salair mining and beneficiation complex	Kemerovskaya Oblast'	2,000
Zinc, recoverable Zn content of ore	Altay mining and beneficiation complex	Altayskiy Kray, South Siberia	1,000
Do.	Dalpolimetal mining and beneficiation complex	Primorskiy Kray	25,000
Do.	Nerchinsk polymetallic complex	Zabaykal'skiy Kray'	12,500
Do.	Sadon lead-zinc complex	Severnaya Osetiya-Alaniya Republic	14,000
Do.	Salair mining and beneficiation complex	Kemerovskaya Oblast'	10,500
Lithium and its compounds	JSC Novosibirsk Chemical Plant (Corporation TVEL)	Novosibirsk	NA
Do.	JSC Chemical-Metallurgical Plant (Corporation TVEL)	Kransnoyarsk	NA
Magnesite	Karagayskiy open pit (Magnezit Group) and Magnezitovaya underground mine (Magnezit Group)	Sakha group of deposits (Chelyabinskaya Oblast')	3,800,000 [3]
Magnesium, metal (for sale)	Avisma plant	Berezniki	35,000
Do.	Solikamsk plant (Uralkaliy)	Permskiy Kray	30,000
Mica	Emel'dzhak deposit, Aldan Shield	Sakha (Yakutiya) Republic	NA
Do.	Lopatova Guba mica pit, Northern Kareliya	Kareliya Republic	NA
Do.	Kovdor phlogopite mine (Mica Mine; Slyuda Mine; Kovdorslyuda Shaft)	Kola Peninsula, Murmanskaya Oblast'	NA
Do.	Irkutsk complex (JSC "Vostoksluda")	Mam deposit, Irkutskaya Oblast'	NA
Molybdenum	Dzhida tungsten-molybdenum mine	West Transbaikal	NA
Do.	Sorsk molybdenum mining and beneficiation complex [Strikeforce Mining and Resources Co. (SMR)]	Khakasiya Republic	NA
Do.	Tyrnyauz tungsten-molybdenum mine	North Caucasus	NA
Do.	Shakhtaminskoye molybdenum mining enterprise	Zabaykal'skiy Kray	NA
Do.	Zhireken mining and beneficiation complex [Strikeforce Mining and Resources Co. [SMR])	East Transbaikal	NA

See footnotes at end of table.

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TABLE 2—Continued

RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity[e]
Natural gas million cubic meters	Komi Republic	Komi Republic	8,000
Do. do.	Noril'sk area	Noril'sk region, Kola Peninsula	5,500
Do. do.	North Caucasus	North Caucasus	6,000
Do. do.	Sakhalin	Russian Far East	2,000
Do. do.	Tomskaya Oblast'	West Siberia	500
Do. do.	Tyumenskaya Oblast, of which	do.	575,000 [3]
Do. do.	Medvezhye field	do.	(75,000)
Do. do.	Urengoy field	do.	(300,000)
Do. do.	Vyrngapur field	do.	(17,000)
Do. do.	Yamburg field	do.	(170,000)
Do. do.	Bovanenko field	Yamal Peninsula	NA
Do. do.	Pestsovoyy field	Ob-Taz Gulf area	NA
Do. do.	Zapolyarnyy field	do.	NA
Do. do.	Schtokman field	Barents Sea	NA
Do. do.	Urals	Ural Mountains	45,000
Do. do.	Volga	Volgogradskaya Oblast'	6,000
Do. do.	Sakha (Yakutiya) Republic	Sakha (Yakutiya) Republic	1,500
Nepheline syenite	Apatite complex	Kola Peninsula	1,500,000
Do.	Kiya-Shaltyr Mine (United Company RUSAL)	Goryachegorsk massif, east Siberia	5,000,000
Nickel:			
Ni in ore	OJSC Mining and Metallurgical Company (MMC) Norilsk Nickel	Noril'sk region, Kola Peninsula	300,000
Do.	OAO Yuzhuralnikel	Southern Ural Mountains	3,000
Do.	OAO Ufaleynikel	Chelyabinskaya Oblast'	18,000
Metal:			
Smelting	OJSC Mining and Metallurgical Company (MMC) Norilsk Nickel	Noril'sk region, Kola Peninsula	160,000
Do.	do.	Pechenga	50,000
Do.	do.	Monchegorsk	50,000
Refining	do.	Noril'sk region, Kola Peninsula	100,000
Do.	do.	Monchegorsk	140,000
Ni products and Ni in FeNi	ZAO Rezhnikel, OAO Ufaleynikel, and OAO Yuzhuralnikel	Southern Ural Mountains	65,000
Niobium (columbium)	Karnarsurt mining enterprise (AO Sevredmet)	Lovozerskoye deposit, Kola Peninsula	12,000
Oil shale	Leningradslanets Association	Slantsy, Leningradskay Oblast'	5,000,000
Petroleum	OAO Bashneft	Bashkortostan Republic	12,000,000
Do.	OAO Gazprom	Deposits throughout Russia	50,000,000
Do.	OAO Lukoil	West Siberian deposits:	100,000,000 [3]
		Kechimovskoye	
		Nivagalskoye	
		Ural Mountains deposits	
		Volga deposits	
		Timen-Pechora deposit:	
		Yuzhnaya Khylchuya	
		Komi Republic deposits:	
		Kyrtayelskoye	
		Pashshorskoye	
		Perevoznoye	
Do.	OAO Novatek	West Siberia	5,000,000
Do.	OAO Rosneft	Deposits throughout Russia	120,000,000
Do.	Russneft	Central and West Siberia, Ural Mountains and Volga regions	15,000,000

See footnotes at end of table.

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TABLE 2—Continued

RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity[e]
Petroleum—Continued	JSC Slavneft	West Siberia and Krasnoyarskiy Kray	20,000,000
Do.	OJSC Surgutneftegas	East and West Siberia	60,000,000
Do.	OAO Tatneft	Deposits: Romashkinskoye, Novo-Elkkhovskoye, Bavlinskoye, Bondyuzskoye, Pervomayskoye, Sabandchinskoye	30,000,000 [3]
Do.	OAO TNK-BP	Deposits: Kamennoye, Kovyatka, Russkoye, Suzunskoye, Tagulskoye, Uvat, Verkhnechonsk	75,000,000 [3]
Phosphate rock	OAO Fosforit	Kingisepp deposit in Leningradskaya Oblast'	3,500,000
Do.	Lopatino and Yegorevsk deposits	Moskovskaya Oblast'	NA
Do.	Polpinskoye deposit	Bryanskaya Oblast'	NA
Do.	Verkhnekamsk deposit	Ural Mountains	NA
Phosphate rock, apatite concentrate	OAO Apatit mining and chemical complex	Kola Peninsula	12,000,000
Do.	Kovdor iron mining complex	do.	700,000
Platinum-group metals:			
Ore, PGM content	OJSC Mining and Metallurgical Company (MMC) Norilsk Nickel	Noril'sk region, Kola Peninsula	150
Do.	ZAO Koryakgeoldobycha and unspecified artels	Placer deposits (mostly platinum), Ural Mountains; Siberia; Russian Far East	10 [3]
Do.	ZAO Amur Artel	Amur region	4
Metals	Krasnoyarsk Nonferrous Metals Plant (Krastsvetmet)	Krasnoyarskiy Kray	NA
Do.	Ekaterinburgskiy plant (EZOTsM)	Sverdlovskaya Oblast'	NA
Do.	Priobsk plant (OJSC Gazprom Neft)	Khanty-Mansiyskiy Avtomnyy Okrug	NA
Potash, K_2O equivalent	Uralkaliy	Verkhnekamsk deposit	3,000,000
Do.	OAO Silvinit	Solikamsk-Berezniki regions, Ural Mountains	2,000,000
Rare earths	JSC Sevredmet	Lovozerskoye deposit, Kola Peninsula	NA
Salt	AO Bassol'	Lake Baskunchak in Astrakhanskaya Oblast'	2,500,000
Do.	Dus-Dagskoe deposit	Dus-Dag Mountains	25,000
Selenium	Joint Stock Company (JSC) Kyshtym copper electrolytic plant	Kyshthym	5
Do.	OJSC Mining and Metallurgical Company (MMC) Norilsk Nickel	East Siberis, Kola peninsula	80
Do.	Ural Mining and Metallurgical Co. (UMMC)	Ural Mountains	90
Silver	OAO Polimetal	Magadanskaya Oblast'	1,000
Do.	ZAO Cukotka mining and processing complex	NA	300

See footnotes at end of table.

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TABLE 2—Continued
RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity[e]
Soda ash	Achinsk plant	East Siberia	595
Do.	Berezniki plant	Ural Mountains	1,080
Do.	Pikalevo plant	Leningradskaya Oblast'	200
Do.	Sterlitamak plant	Bashkortostan Republic	2,135
Do.	Volkhov plant	Leningradskaya Oblast'	20
Steel, crude	Companies:	Locations:	
Do.	OAO Amurmetal	Komsomol'sk-na-Amure	1,600,000
Do.	JSC Asha Metallurgical Plant	Chelyabinskaya Oblast'	450,000
Do.	Beloretsk Iron and Steel Works	Bashkirskoye	380,000
Do.	Chelyabinsk Metallurgical Complex (OAO Mechel)	Chelyabinskaya Oblast'	7,000,000
Do.	Cherepovets Metallurgical Complex (Severstal')	Cherepovets	14,000,000
Do.	Chusovskoy Iron and Steel Works	Permskiy Kray	570,000
Do.	JSC Electrostal Metallurgical Plant	Moscow	314,000
Do.	Gorkovskoy Metallurgichesky Zavod	Nizhegorodskaya Oblast'	78,000
Do.	Gur'yevsk Steel Works	Kemerovskaya Oblast'	160,000
Do.	Karaganda	Orenburgskaya Oblast'	6,300,000
Do.	Kuznetsk Steel Works	Kemerovskaya Oblast'	4,700,000
Do.	Lys'va Metallurgical Plant	Permskiy Kray	350,000
Do.	Magnitogorsk Metallurgical Complex (MMK)	Chelyabinskaya Oblast'	16,200,000
Do.	Nizhniy Sergi Steel Works	Sverdlovskaya Oblast'	300,000
Do.	Nizhniy Tagil Metallurgical Complex (NTMK)	do.	8,000,000
Do.	Nosta JSC (JSC Orsk-Kahlilovo Iron and Steel Works)	Novotroitsk, Orenburgskaya Oblast'	4,600,000
Do.	Novokuznetsk Metallurgical Complex	Novokuznetk	NA
Do.	Novolipetsk Metallurgical Complex (NLMK)	Lipetskaya Oblast'	9,900,000
Do.	Novosibirsk Steel Works (Novosibprokat)	Novosibirskaya Oblast'	1,100,000
Do.	CJSC Omutninsk Metallurgical Plant	Kirovskaya Oblast'	210,000
Do.	Oskol Electric Metallurgical Complex (OEMK)	Staryy Oskol	2,500,000
Do.	Petrovsk-Zabaykal'skiy Steel Works	Petrovsk-Zabaykal'skiy	426,000
Do.	Revdinskiy Steel and Wire Production Works	Sverdlovskaya Oblast'	281,000
Do.	Salda Steel Works	do.	NA
Do.	Serov Steel Works	do.	1,000,000
Do.	Serp i Molot (Moscow Metallurgical Works)	Moscow	70,000
Do.	Severskiy Tube Works	Polevskoy, Sverdlovskaya Oblast'	825,000
Do.	Sibelektrostal Metallurgical Works	Krasnoyarskiy Kray	110,000
Do.	Sulinskiy Steel Works (Staks)	Rostovskaya Oblast'	280,000
Do.	Taganrog Iron and Steel Works (Tagmet)	do.	925,000
Do.	OAO Tulachermet	Tul'skaya Oblast'	18,400
Do.	Ural Steel Works	Orsko-Khalilovo	4,000,000
Do.	Viz-Stal (Verkh-Isetsk Steel Works)	Sverdlovskaya Obalst'	132,000
Do.	Volgograd Steel Works (Red October)	Volgogradskaya Oblast'	2,000,000
Do.	Vyksa Steel Works	Nizhegorodskaya Oblast'	540,000
Do.	Zapsib Met Kombinat Metallurgical Complex	Kemerovskaya Oblast'	6,900,000
Do.	Zlatoust Iron and Steel Works	Zlatoust, Chelyabinskaya Oblast'	1,200,000
Talc	Onotsk deposit	Irkutskaya Oblast'	NA
Do.	Kirgiteysk deposit	Krasnoyarskiy Kray	NA
Do.	Miass deposit	Chelyabinskaya Oblast'	NA
Do.	Shabrovsk deposit	Sverdlovskaya Oblast'	NA
Tantalum, ore	Lovozerskoye deposit	Kola Peninsula	10 [3]
	Zabaykalskiy mining and beneficiation complex	Etykinskoye deposit	

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TABLE 2—Continued

RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity[e]
Tellurium	OJSC Mining and Metallurgical Company (MMC) Norilsk Nickel	NA	5
Do.	Ural Mining and Metallurgical Co. (UMMC)	Ural Mountains	35
Tin:			
Ore	OAO Novosibirsk mining and beneficiation complexes:	Locations:	
	Khinganskoye olovo (Jewish Autonomous District)	Khabarovskiy Kray	NA
Do.	Dalolovo	Solnechnyy deposit, Primorskiy Kray	NA
Do.	Deputatskiy (Sakhaolovo)	Sakha (Yakutiya) Republic	NA
Do.	Vostokolovo	Russian Far East	NA
Do.	Iultin mining and beneficiation complex	Magadanskaya Oblast'	NA
Do.	Khrustalnyy mining and beneficiation complex	Primorskiy Kray	NA
Do.	Pevek mining and beneficiation complex	Magadanskaya Oblast'	NA
Metal	Novosibirsk smelter	Novosibirskaya Oblast'	NA
Do.	Podol'sk smelter	Podol'sk	NA
Do.	OAO Ryaztsvetmet	Ryazanskaya Oblast'	NA
Do.	OAO Zavod pripoyev	Ryazan	NA
Titanium:			
Metal	Moscow plant	Moscow	NA
Do.	Podol'sk plant	Podol'sk	NA
Do.	OAO Verkhnaya Salda Metallurgical Production Association Avisma (VSMPO)-Avisma titanium-magnesium complex	Sverdlovskaya Oblast', Ural Mountains	NA
Sponge	do.	do.	40,000
Tungsten:	Deposits:	Locations:	
W content of concentrates	Aginskoye deposit	Sakha (Yakutiya) Republic	NA
Do.	Antonovogorsk deposit	East Transbaikal,	NA
Do.	Balkan deposit	Northeast of Magnitogorsk, Ural Mountains	NA
Do.	Belukha deposit	East Transbaikal,	NA
Do.	Bom-Grokhom deposit	West Transbaikal	NA
Do.	Dzhida deposit	do.	NA
Do.	Iultin deposit	Magadanskaya Oblast'	NA
Do.	Kti-Teberdaskoye deposit	North Caucasus	NA
Do.	Kvartz Artel	Dzhida region	NA
Do.	Lermontovo enterprise	Lermontovo deposit in Russian Far East	NA
Do.	Novo Orlovsk mining and beneficiation complex	do.	NA
Do.	OAO Primorsk mining and beneficiation complex	do.	NA
Do.	Solnechnoye deposit	Southern Khabarovskiy Kray	NA
Do.	Tyrnyauz tungsten-molybdenum mining and processing complex	Kabardino-Balkariya Republic North Caucasus	NA
Metal, tungsten anhydride	Gidrometallurg plant	do.	NA
Do.	OJSC Pobedit plant	Vladikavkaz	NA
Uranium, U content	JSC Atomredmetzoloto (ARMZ Uranium Holding Co.) enterprises:	Locations:	3,500 [3]
	JSC Dalur mining enterprise	Kurganskaya Oblast'	
	JSC Khiagda mining enterprise	Buryatiya Republic	
	JSC Priargunsky Industrial Mining and Chemical Union	Krasnokamensk, Zabaykal'skiy Kray	
Vanadium:			
Ore	Kachkanar iron mining complex	Ural Mountains	NA
Metal	Chusovoy and Nizhniy Tagil plants	do.	17,000
Pentoxide	Vanadii-Tulachermet	Tul'skaya Oblast', North Caucasus	NA

See footnotes at end of table.

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TABLE 2—Continued
RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity[e]
Zinc:			
Zn content of copper-zinc ore	Bashkir copper-zinc complex	Sibai, southern Ural Mountains	5,000
Do.	Buribai copper-zinc mining complex	Buribai, southern Ural Mountains	1,500
Do.	Gai copper-zinc mining and beneficiation complex	Gai, southern Ural Mountains	25,000
Do.	Kirovgrad copper enterprise	Kirovgrad, central Ural Mountains	1,200
Do.	Sredneuralsk copper complex	Revda, central Ural Mountains	5,000
Do.	Uchali copper-zinc mining and beneficiation complex	Uchalinskiy Rayon, southern Ural	90,000
Metal	OAO Chelyabinsk electrolytic zinc plant	Chelyabinskaya Oblast'	200,000
Do.	OAO Elektrotsink plant [Ural Mining and Metallurgical Co. (UMMC)]	Vladikavkaz, North Caucasus	110,000
Do.	Uralelektromed plant [Ural Mining and Metallurgical Co. (UMMC)]	Verkhnaya Pyshma	17,000
Zirconium:			
Baddaleyite concentrate	Kovdor iron ore mining and beneficiation complex	Kola Peninsula	3,500
Metal	Chepetsky metallurgical plant (Corporation TVEL)	Glazov, Udmurtiya Republic	NA

[e]Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.
[1]Many location names have changed since the breakup of the Soviet Union. Many enterprises, however, are still named or commonly referred to based on the former location name, which accounts for discrepancies in the names of enterprises and that of locations.
[2]United Company RUSAL was formed by the merger of RUSAL (Russian Aluminum), SUAL (Siberian-Urals Aluminium Company Group), and the alumina assets of Glencore, completed in March 2007.
[3]Capacity estimates are totals for all enterprises that produce that commodity.

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THE MINERAL INDUSTRY OF SERBIA

By Mark Brininstool

Serbia remained a modest producer of mineral commodities and its output was not significant in terms of world production. Within the Southern Balkans, the country was an important producer of such metals as copper, iron and steel, and refined petroleum products. On February 18, 2008, the Serbian Province of Kosovo declared its independence. The U.S. Government has recognized Kosovo's independence and therefore Kosovo is included as a separate country in the U.S. Geological Survey's Minerals Yearbook 2008. Consequently, this report contains economic and mineral production data only for Serbia; the data for Kosovo are included in a separate report for Kosovo.

Minerals in the National Economy

In 2009, Serbia's gross domestic product (GDP) decreased by 3.1% owing to the world economic crisis and the resulting slowdown in economic activity. Mining and quarrying made up about 1.3% of the GDP, and mining of coal and peat made up about 79% of the total value of mining and quarrying. The value of exports of mining and quarrying products decreased by about 34% to $42 million and the value of mining and quarrying product imports decreased by about 45% to about $2 billion compared with that of 2008. The large trade deficit in mining and quarrying was mainly owing to imports of crude petroleum and gas products (including service activities), which were valued at about $1.8 billion in 2009 and $3.1 billion in 2008. In 2009, about 89% of crude petroleum and 98% of natural gas imports were from Russia (Statistical Office of the Republic of Serbia, 2010, p. 122, 125, 295-296, 304).

Production

Production of pig iron, steel semimanufactures, and crude steel decreased by 36%, 35%, and 34%, respectively, compared with production in 2008. Copper ore production increased by about 15%, and lead content of lead-zinc ores was estimated to have increased by about 13%. Sand and gravel production decreased by 33%; cement, by 21%; and lime, by 14%. Nitrogen (content of ammonia) production was estimated to have increased by 13%. Production of petroleum refinery products decreased by about 11% (table 1).

Structure of the Mineral Industry

Most mineral producers were privately owned, but the Serbian Government owned important mineral producers, including the country's only copper producer [Rudarsko Topionicki Bazen Bor (RTB Bor)], all lignite producers, and a 49% share in Naftna Industrija a.d., which produced all Serbia's natural gas and crude and refined petroleum. Table 2 is a list of Serbia's major mineral industry facilities.

Commodity Review

Metals

Copper.—After unsuccessful attempts to sell RTB Bor in 2007 and 2008, the Privatization Agency of the Republic of Serbia (the Privatization Agency) sought a strategic partner to purchase 67% of RTB Bor. The minimum bidding price was set at $300 million, and bids were due by January 30, 2009. The offer failed to attract potential investors, and in February 2009, the Privatization Agency again changed the conditions for the sale by offering a 40% stake in the company with a minimum bid of $116 million (Privatization Agency of the Republic of Serbia, 2008, 2009; B92, 2009b).

The second search for a strategic partner was also unsuccessful, and in May, the Serbian Government announced that it would suspend its efforts to find an outside investor for RTB Bor. The Government maintained ownership of the company and planned to invest in its production facilities and environmental improvements and to work to resolve any issues surrounding the company's debt. Efforts to privatize RTB Bor could continue if market conditions improve and the interest of potential buyers increases (B92, 2009a).

In 2009, Empire Mining Corp. and Euromax Resources Ltd. of Canada owned copper exploration licenses in Serbia, although no significant results were reported. In early 2010, Dundee Precious Metals Inc. of Canada announced that it intended to sell its copper exploration licenses in Serbia to two companies, Rodeo Capital of Canada and Queensland Minerals Ltd. of Australia (Dundee Precious Metals Inc., 2010, p. 3, 14).

Iron and Steel.—Pig iron and crude steel production significantly decreased owing to the world economic crisis and the resulting reduction in orders for steel products. In April, U.S. Steel Serbia d.o.o. (Serbia's only producer of pig iron and crude steel) stopped production, but it restarted production in June. Production of crude steel at U.S. Steel Serbia as reported by the World Steel Association shows fluctuations in steel production as the economic climate and demand for steel changed. Production was about 64,000 metric tons per month (t/mo) in the first 3 months of 2009, then dropped to 11,000 t/mo in April and to zero in May before increasing to an average of 60,000 t/mo in June and July and to 155,000 t/mo in the last 5 months of the year as economic conditions improved (Vasovic, 2009; World Steel Association, 2009).

Lithium.—Rio Tinto plc reported that its lithium project in Jadar had 125.3 million metric tons (Mt) of inferred resources of ore containing 1.8% lithium oxide and 16.2 Mt of contained borates. The project was still in the early stages of development, but Rio Tinto estimated that the project could begin production within 6 years (Rio Tinto plc, 2010, p. 72, 74; Tony Shaffer, Principal Adviser, Media Relations, Rio Tinto plc, written commun., October 15, 2010).

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Molybdenum.—In 2008, an independent NI 43-101 resource estimate for Dundee's Surdulica molybdenum-rhenium project in southeastern Serbia reported inferred resources of 106 Mt grading 518 parts per million (ppm) molybdenum (0.052%) and 0.16 ppm rhenium. In the fourth quarter of 2008, Dundee halted all activities in Serbia to reduce the company's expenses during the slowdown in the global metals market. In early 2010, Dundee announced that it intended to sell its Surdulica molybdenum exploration license to Queensland Minerals (Dundee Precious Metals Inc., 2009, p. 4, 24; 2010, p. 3, 14).

Mineral Fuels

Coal.—At the end of October, Serbia's leading coal producer, PD RB Kolubara d.o.o., began production at the Veliki Crljeni Mine, which had a reported production capacity of 5 million metric tons per year. Electric Power Industry of Serbia (the owner of PD RB Kolubara) stopped listing the Tamnava East Mine in its 2009 annual report, and although no explanation was given for this, it is assumed that the Tamnava East Mine was exhausted in 2008; therefore, the mine has been removed from the list of coal producers in table 2. TE-KO Kostolac d.o.o. stopped production at the Klenovnik Mine in 2008 and at the Cirikovac Mine in early 2009, and the company's only remaining operating mine was the Drmno Mine (Electric Power Industry of Serbia, 2010, p. 32).

Natural Gas and Petroleum.—Serbia was heavily dependent on imports from Russia to meet its demand for crude petroleum and natural gas. In 2009, about $879 million of crude petroleum and about $615 million of natural gas were imported from Russia; the total volume of imports from Russia accounted for about 89% of all crude petroleum and 98% of all natural gas imported into Serbia (Statistical Office of the Republic of Serbia, 2010, p. 304).

On February 2, JSC Gazprom Neft of Russia completed its purchase of 51% of Naftna Industrija Srbije AD (NIS), which was Serbia's only producer of natural gas, petroleum, and refined petroleum products. The Serbian Government maintained ownership of the remaining 49% of shares. The agreement for the sale had been signed on December 24, 2008, and stated that the Government would sell the 51% share of NIS to Gazprom Neft for 400 million euros (€) (about $590 million) and investments of an additional €500 million (about $740 million) in the company before 2012. JSC Gazprom of Russia and Serbia's state gas company, Srbijagas a.d., made further progress on other energy agreements that had been signed in 2008. In October, representatives of Gazprom and Srbijagas signed an agreement on the conditions for the establishment of a joint venture to construct and operate the 0.8- to 1-billion-cubic-meter Banatski Dvor underground natural gas storage facility, and in November, representatives of Gazprom and Srbijagas signed documents to establish South Stream Serbia AG, which was a joint venture that would prepare a feasibility study of the Serbian section of the South Stream natural gas pipeline. The agreements stated that Gazprom would own 51% of each joint venture, and that Srbijagas would own the remaining 49% (JSC Gazprom, 2009; JSC Gazprom Neft, 2009; RIA Novosti, 2009).

Outlook

Mineral production in Serbia is expected to remain small by world standards. Output of copper and refined petroleum could increase if planned investments are made in RTB Bor and NIS. Development of lithium and molybdenum exploration projects could also make Serbia a significant regional producer of these important minerals.

References Cited

B92, 2009a, Govt. gives up attempts to sell RTB: B92, May 18. (Accessed October 22, 2009, at http://www.b92.net/eng/news/business-article.php?yyyy=2009&mm=05&dd=18&nav_id=59236.)

B92, 2009b, RTB Bor to go under hammer for 4th time: B92, February 27. (Accessed October 22, 2009, at http://www.b92.net/eng/news/business-article.php?yyyy=2009&mm=02&dd=27&nav_id=57482.)

Dundee Precious Metals Inc., 2009, Management's discussion and analysis of consolidated financial conditions and results of operations for the financial year ended December 31, 2008: Dundee Precious Metals Inc., February, 26 p. (Accessed October 23, 2009, at http://www.dundeeprecious.com/Theme/Dundee/files/annual_report/MDAYE08.pdf.)

Dundee Precious Metals Inc., 2010, Annual report 2009: Dundee Precious Metals Inc., April 8, 79 p. (Accessed October 5, 2010, at http://www.dundeeprecious.com/Theme/Dundee/files/annual_report/Dundee_AR09_Final.pdf.)

Electric Power Industry of Serbia, 2010, Annual report 2009: Belgrade, Serbia, Electric Power Industry of Serbia, June, 70 p.

JSC Gazprom, 2009, Gazprom and Srbijagas create South Stream Serbia AG joint venture: JSC Gazprom, November 17. (Accessed November 18, 2009, at http://www.gazprom.com/press/news/2009/november/article71282/.)

JSC Gazprom Neft, 2009, Gazprom Neft completes the acquisition of 51% of NIS shares: JSC Gazprom Neft, February 3. (Accessed October 18, 2010, at http://www.gazprom-neft.com/press-center/press-releases/?id=1262.)

Privatization Agency of the Republic of Serbia, 2008, Public invitation for participation in the public tender for selection of a strategic partner for RTB Bor Group: Privatization Agency of the Republic of Serbia, November 8. (Accessed October 22, 2009, at http://www.priv.yu/.)

Privatization Agency of the Republic of Serbia, 2009, Public invitation for selection of a strategic partner for RTB Bor Group: Privatization Agency of the Republic of Serbia, February 27. (Accessed October 22, 2009, at http://www.priv.yu/.)

RIA Novosti, 2009, Russia, Serbia agree natural gas storage deal: RIA Novosti, October 15. (Accessed October 16, 2009, at http://en.rian.ru/business/20091015/156474359.html.)

Rio Tinto plc, 2010, 2009 annual report: London, United Kingdom, and Melbourne, Australia, Rio Tinto plc, March, 237 p.

Statistical Office of the Republic of Serbia, 2010, Statistical yearbook of Serbia 2010: Belgrade, Serbia, Statistical Office of the Republic of Serbia, October, 484 p.

Vasovic, Aleksandar, 2009, US Steel's Serbian unit to halt furnaces: Thompson Reuters, April 2. (Accessed April 3, 2009, at http://in.reuters.com/article/idINL2940886200904O2.)

World Steel Association, 2009, Steel statistics—Total 2009: World Steel Association. (Accessed October 7, 2010, at http://www.worldsteel.org/?action=stats&type=steel&period=latest&month=13&year=2009.)

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TABLE 1
SERBIA: PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008	2009
METALS						
Aluminum ingot, including alloys, secondary		1,691 r	2,031 r	3,669 r	1,882 r	1,789
Copper:						
Mine and concentrator output:						
Ore, gross weight	thousand metric tons	6,005	5,775	6,867	8,680	10,014
Concentrate, Cu content e		12,900	12,000	16,500	18,800	19,000
Metal: e						
Blister and anodes:						
Primary		30,000	40,000	30,200	31,900	32,000
Secondary		1,000	1,000	1,000	1,000	1,000
Total		31,000	41,000	31,200	32,900	33,000
Refined: e						
Primary		30,100	40,000	30,600	32,800	33,000
Secondary		1,000	1,000	1,000	1,000	1,000
Total		31,100	41,000	31,600	33,800	34,000
Gold, refined e	kilograms	335 3	450	500 3	500	500
Iron and steel, metal:						
Pig iron		1,115,195	1,529,177	1,485,000	1,582,000	1,006,000
Crude steel		1,286,000	1,837,000	1,478,000	1,662,000	1,097,000
Semimanufactures		1,890,330	2,379,918	2,431,380	2,393,430	1,556,017
Lead:						
Ore:						
Gross weight (Pb-Zn ore)		162,000	172,000	198,000	202,000	225,000
Pb content e		1,300 r	1,400 r	1,600 r	1,600 r	1,800
Metal, including alloys, secondary, refined		2,499 r	2,676 r	1,273 r	929 r	900 e
Magnesium, metal, secondary e		1,500	1,500	2,000	1,500	1,500
Platinum-group metals: e						
Palladium	kilograms	19 3	15	15	15	15
Platinum	do.	3 3	2	2	2	2
Selenium e	do.	8,315 3	7,500	7,500	7,500	7,500
Silver, mine output, Ag content e	do.	2,648 3	2,200	4,150	4,000	4,000
Zinc:						
Zn content of concentrate e		1,000	2,000	1,000	1,000	1,000
Refined		18,000	15,000	--	--	--
INDUSTRIAL MINERALS						
Asbestos, ore		4,080	4,500	--	--	--
Cement	thousand metric tons	2,276	2,565	2,677	2,843	2,232
Gypsum, crude e		45,000	45,000	45,000	45,000	45,000
Lime	thousand metric tons	400 e	377	320	292	251
Nitrogen, N content of ammonia e		111,000	80,000	85,000	47,000 r	53,000
Salt, all sources		35,000 e	29,847	30,023	30,115	28,783
Sand and gravel, excluding glass sand e, 4	thousand metric tons	12,000	13,700	13,900	13,800	9,200
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Bituminous	thousand metric tons	65	65	66	66	69
Brown coal and lignite	do.	34,928	36,720	37,007	38,519	38,828
Total	do.	34,993	36,785	37,073	38,585	38,897
Natural gas, gross production	million cubic meters	320	282	274	282	283
Petroleum: e, 5						
Crude	thousand 42-gallon barrels	4,810	4,850	4,740	4,720	4,920
Refinery products	do.	19,300 r	19,100 r	18,900 r	18,700 r	16,700

eEstimated; estimated data are rounded to no more than three significant digits. rRevised. do. Ditto. -- Zero.

[1]Table includes data for Serbia only. No data are included for Kosovo, which declared its independence in February 2008.

[2]Table includes data available through October 19, 2010.

[3]Reported figure.

[4]Production figures were converted to tons from production reported in cubic meters.

[5]Figures were converted to barrels from production reported in thousand metric tons, which was reported as the following: Crude production: 2005—648; 2006—653; 2007—639; 2008—636; and 2009—663. Petroleum products: 2005—2,582; 2006—2,508; 2007—2,502; 2008—2,462; and 2009—2,227.

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TABLE 2
SERBIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Antimony:				
Ores and concentrates		Farmakom M.B.	Mines and mills near Zajaca	NA
Do.		do.	Mines and mill at Rajiceva Gora	NA
Metal		do.	Smelter at Zajaca	NA
Cement		Beocinska Fabrika Cementa (Lafarge, 50%)	Plant at Beocin	2,000
Do.		Holcim (Srbija) a.d. (Holcim Ltd.)	Plant at Popovac	1,400
Do.		Cementara Kosjeric (Titan Group, 100%)	Plant at Kosjeric	700
Coal:				
Bituminous		JP PEU Resavica	Ibarski Rudnici Mines near Baljevac and Vrska Cuka Mines	70 e
Brown coal		do.	Underground mines near Resavica, Bogdinac, Bogovina, Krepoljin, and Stavalj	400 e
Lignite		PD RB Kolubara d.o.o. (Electric Power Industry of Serbia)	Opencast mines: Field B, Field D, Veliki Crljeni, and Tamnava West near Vreoci	31,000
Do.		TE-KO Kostolac d.o.o. (Electric Power Industry of Serbia)	Opencast mines: Cirikovac and Drmno[1]	8,500
Do.		JP PEU Resavica	Underground mine at Lubnica	60 e
Copper:				
Metal		Rudarsko Topionicki Bazen Bor (RTB Bor) (Serbian Government, 100%)	Smelter at Bor	170
Do.		do.	Electrolytic refinery at Bor	170
Mine production, Cu content of concentrate		do.	Mine and mill "Jama" at Bor	8
Do.		do.	Mine and mill at Majdanpek	65
Do.		do.	Mine and mill at Veliki Krivelj	35
Lead-zinc ore		Contango d.o.o.	Mine and mill at Rudnik	250 e
Do.		NA	Grot Mine near Vranje	300 e
Do.		Farmakom M.B.	Mines at Lece, Rajiceva Gora, Ravnaja, and Suva Ruda	350 e
Do.		Mineco Ltd.	Mine at Veliki Majdan, near Ljubovija	60 e
Do.		NA	Mill at Kriva Feja	NA
Lime		Jelen Do a.d.	Plant in Jelen Dol, west of Cacak	80
Do.		U.S. Steel Serbia d.o.o.	Plant at Kucevo	NA
Do.		Ravnaja AD	Plant at Mali Zvornik	NA
Magnesite, concentrate		Rudnici Magnezita "Sumadija"	Mine and plant at Sumadija, 20 kilometers northwest of Cacak	NA
Do.		MG Serbien d.o.o.	Bela Stena, near Baljevac	NA
Magnesium, metal:				
Primary		do.	do.	8,500
Secondary		do.	do.	12,000
Natural gas	million cubic meters	Naftna Industrija a.d. (NIS) (JSC Gazprom Neft, 51%, and Serbian Government, 49%)	Gas is produced from about 110 wells throughout northern Serbia	300 e
Petroleum:				
Crude	thousand 42-gallon barrels per day	Naftna Industrija a.d. (NIS) (JSC Gazprom Neft, 51%, and Serbian Government, 49%)	Crude petroleum produced at about 800 wells; the main oil field is located in northeast Serbia	15 e
Refined		Naftna Industrija a.d. (NIS) (JSC Gazprom Neft, 51%, and Serbian Government, 49%)	Refinery at Pancevo	4,800
Do.		do.	Refinery at Novi Sad	2,500
Pig iron		U.S. Steel Serbia d.o.o.	Blast furnace at Smederevo	NA
Steel, crude		do.	Plant at Smederevo	2,200
Zinc, metal		Hemijska Industrija Zorka	Electrolytic plant at Sabac	30

Do., do. Ditto. NA Not available
[1]The Cirikovac Mine was shut down sometime in the first half of 2009.

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The Mineral Industry of Slovakia

By Mark Brininstool

Slovakia produced a modest range of mineral products but was not a significant world or regional producer of any minerals. In 2009, Slovakia's real gross domestic product (GDP) decreased by 4.7% compared with that of 2008. In 2008 (the latest year for which data were available), mining and quarrying made up about 0.6% of the nominal GDP. The value of imports of crude petroleum and natural gas made up about 9% of the total value of all imports in 2009. The value of exports of refined petroleum made up about 4% of the total value of all exports, and the value of exports of iron, steel, and ferroalloys made up about 5% (Balaz and Kusik, 2010, p. 15; Statistical Office of the Slovak Republic, 2010a, b).

Production

In 2009, production of mineral commodities generally decreased, mainly owing to lower market demand for mineral commodities as a result of the world financial crisis. Compared with 2008, production of ferrosilicon decreased by 20%; steel, by 16%; pig iron, by 14%; and primary aluminum, by 8%. Secondary copper smelter production increased by 26%. In table 1, production data for most industrial minerals were estimated, but reported production of cement and dolomite each decreased by 27%, and that of lime, by 20%. Coke production decreased by 9% (table 1).

Structure of the Mineral Industry

Three notable changes were made to table 2. Ownership information for Kovohuty, a.s., which was the only copper producer in Slovakia, was changed to show better that Kovohuty was directly owned by Montanwerke Brixlegg AG of Austria, which was in turn owned by A-TEC Industries AG of Austria. A-TEC Industries was listed as the owner in the 2008 Minerals Yearbook. No actual change in ownership took place in 2009. Cementaren Lietavska Lucka was removed from the list of cement producers in table 2 because new information was found indicating that the company stopped cement production in the mid-1990s and focused on the production of crushed limestone. The name of the coal mining company listed as Bana Zhorie, a.s. in table 2 of the 2008 Minerals Yearbook has been changed to Bana Cary, a.s. It was not entirely clear when the name change took place but it seems to have been sometime in 2007 or 2008.

Commodity Review

Metals

Copper.—In late 2008, Kovohuty, which was Slovakia's only copper producer, began operating a new 60,000-metric-ton-per-year (t/yr) copper smelter that would process secondary scrap materials. Anode production capacity in table 2 was increased to 90,000 t/yr (from 30,000 t/yr in 2008) to show this change (Robert Stibich, Member of the Board of Directors, Kovohuty, a.s., written commun., October 7, 2010).

Gold.—In February 2009, Tournigan Energy Ltd. reached an agreement with Ortac Resources Plc. of the United Kingdom for the sale of its Kremnica gold exploration property. In January 2010, a new purchase agreement was signed that gave Ortac Resources the right to purchase the remaining 80% of shares in the Kremnica project (Tournigan Energy Ltd., 2010, p. 7).

Iron and Steel.—Crude steel production declined significantly owing to lower market demand for steel products as a result of the world financial crisis. Production was also temporarily reduced in January owing to a reduction of gas supplies when gas transit through Ukraine was halted as Russian and Ukrainian gas companies failed to settle disagreements over debts owed for gas use and transit. U.S. Steel Kosice, s.r.o. reduced production of continuously cast steel slabs by 15% to about 3.5 million metric tons (Mt), and billet production at Zeleziarne Podbrezova a.s. decreased by 47.9% to 191,166 metric tons (t) in 2009 compared with production in 2008. Zeleziarne Podbrezova reduced its workforce by 726 employees in 2009 and finished the year with an average of 3,023 employees (U.S. Steel Kosice, s.r.o., 2009, p. 20; 2010, p. 18; Zeleziarne Podbrezova a.s., 2010, p. 14, 20).

Mineral Fuels

Coal.—The coal industry in Slovakia is undergoing restructuring, which is likely to result in a decrease in production during the next decade. According to estimates by the Ministry of the Economy of the Slovak Republic, production in 2015 would be about 2 million metric tons per year (Mt/yr); in 2025, 1.5 Mt/yr; and in 2030, 1 Mt/yr. Hornonitranske Bane Prievidza, a.s. (HBP) was expected to close the mine at Cigel by 2015; the mine at Handlova was expected to produce about 300,000 t/yr until 2020 and was expected to close after that year. HBP's mine at Novaky was expected to produce 1.2 Mt in 2015 and 2020, 1 Mt in 2025, and 0.5 Mt/yr in 2030; the mine was expected to close after that year. Bana Cary, a.s. was expected to produce about 500,000 t/yr until about 2030 but was expected to continue to operate until 2050. The Bana Dolina, a.s. lignite mine had been expected to close in 2009, but it was reported that it would continue small amounts of production through 2011 or 2012 (Ministry of the Economy of the Slovak Republic, 2008, p. 33, 35; Rademaekers, Koen, and others, 2008, p. 83).

Outlook

Slovakia will likely continue to produce modest amounts of mineral commodities, but no major increases in production are expected and decreased coal production is expected during the next several decades. The country is likely to continue to import the majority of its metallic ores and concentrates and mineral fuels.

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References Cited

Balaz, Peter, and Kusik, Dusan, eds., 2010, Slovak minerals yearbook 2009: Bratislava, Slovakia, State Geological Institute of Dionyz Stur, 163 p.

Ministry of the Economy of the Slovak Republic, 2008, Energy security strategy of the Slovak Republic—Strategy core document: Ministry of the Economy of the Slovak Republic, October 17, 157 p. (Accessed October 19, 2009, at http://www.economy.gov.sk/strategy-documents/131028s.)

Rademaekers, Koen, Eichler, Lisa, Meindert, Lars, Morsy, Salim, Stoicescu, Daniela, and Volkerink, Bjørn, 2008, An evaluation of the needs for state aid to the coal industry post 2010: European Commission, December 9, 150 p. (Accessed August 2, 2010, at http://ec.europa.eu/energy/coal/consultations/doc/ecorys_study_annex.pdf.)

Statistical Office of the Slovak Republic, 2010a, Foreign trade of the Slovak Republic, December 2009—Commodity structure by the classes of CPA (version 2008) by months: Statistical Office of the Slovak Republic. (Accessed August 12, 2010, at http://portal.statistics.sk/showdoc.do?docid=7407.)

Statistical Office of the Slovak Republic, 2010b, Gross domestic product in the 4th quarter of 2009: Statistical Office of the Slovak Republic, March 5. (Accessed August 12, 2010, at http://portal.statistics.sk/showdoc.do?docid=20992.)

Tournigan Energy Ltd., 2010, Annual report for the year ended September 30, 2009: Vancouver, British Columbia, Canada, Tournigan Energy Ltd., 29 p.

U.S. Steel Kosice, s.r.o., 2009, Consolidated annual report and consolidated financial statements for 2008: Kosice, Slovakia, U.S. Steel Kosice, s.r.o., June, 56 p.

U.S. Steel Kosice, s.r.o., 2010, Annual report 2009: Kosice, Slovakia, U.S. Steel Kosice, s.r.o., June, 146 p.

Zeleziarne Podbrezova a.s., 2010, Annual report 2009: Podbrezova, Slovakia, Zeleziarne Podbrezova a.s., June, 25 p.

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TABLE I

SLOVAKIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007	2008	2009 [e]
METALS						
Aluminum ingot, primary		159,203 [r]	158,289	160,461	162,995	149,604 [3]
Copper, smelter, secondary	thousand metric tons	16	22	20	27	34 [3]
Gold, content of concentrate	kilograms	109	84	92	90 [r, e]	90
Iron and steel:						
Iron ore:						
Gross weight	do.	534	583	570	392	390
Metal content[e]	do.	180 [r]	200 [r]	190 [r]	130 [r]	130
Concentrate, gross weight	do.	259	311	349	182	180
Metal:						
Pig iron	do.	3,681	4,145	4,012	3,529	3,019 [3]
Ferroalloys:						
Ferrochromium		894	19	--	--	--
Ferromanganese		43,458	59,391	74,065	61,194 [r]	55,000
Ferrosilicomanganese		47,843	59,128	71,587	59,940 [r]	55,000
Ferrosilicon		16,512	16,155	8,583	10,844 [r]	8,622 [3]
Steel, crude	thousand metric tons	4,485 [r]	5,094	5,089 [r]	4,478 [r]	3,747 [3]
Semimanufactures	do.	4,470	4,800 [e]	5,069	4,477	3,740
INDUSTRIAL MINERALS						
Asbestos		1,000	1,000	400	200	200
Barite:						
Mine output		26,000	57,000	58,000	20,000	20,000
Concentrate		13,000	16,000	11,000	12,950	13,000
Basalt		100,000	79,000	69,000	63,000	60,000
Cement, hydraulic	thousand metric tons	3,499 [r]	3,593 [r]	3,718 [r]	4,157	3,021 [3]
Clays:						
Bentonite		97,000	136,000	149,000	145,000	145,000
Ceramic		39,000	58,000	47,000	47,000	47,000
Kaolin		31,000	58,000	46,000	44,000	44,000
Refractory		2,000	--	--	12,000	12,000
Feldspar		3,000	3,000	--	10,000	10,000
Gypsum and anhydrite, crude		107,000	126,000	151,000	152,000	150,000
Lime, hydrated and quicklime	thousand metric tons	946	1,104	1,123	1,082	867 [3]
Magnesite, concentrate	do.	920	941	957	807	800
Nitrogen, N content of ammonia[e]		236,040 [3]	241,383 [3]	260,000	260,000	260,000
Perlite		13,000	16,000	20,000	25,000	25,000
Salt		100,000	99,000	101,000	99,000 [r]	100,000
Sand and gravel[e]	thousand metric tons	6,900	8,000	8,200 [r]	9,300 [r]	8,500
Silica sand (foundry and glass sands)	do.	533	524	591	619	620
Stone:						
Dolomite	do.	1,021	990	1,057	1,249	908 [3]
Limestone and other calcareous stones for cement	do.	6,034	6,611	9,615	4,992	5,099 [3]
Quartzite		2,000	3,000	1,000	-- [r]	-- [3]
Crushed stone[e]	thousand metric tons	15,300	15,800	15,000	18,500 [r]	16,000
Zeolites		42,000	48,000	57,000	87,000	85,000
MINERAL FUELS AND RELATED MATERIALS						
Coal, brown and lignite	thousand metric tons	2,511	2,200	2,111	2,423	2,572 [3]
Coke, unspecified		1,846	1,857	1,856	1,737	1,573 [3]
Natural gas	million cubic meters	211	135	134	111	110
Petroleum:[e, 4]						
Crude	thousand 42-gallon barrels	240	200	160	140	140
Refinery products	do.	42,000	43,700	48,000	47,100	48,100

[e]Estimated; estimated data are rounded to no more than three significant digits. [r]Revised. do. Ditto. -- Zero.

[1]Table includes data available through August 12, 2010.

[2]In addition to the commodities listed, a small amount of silver occurs in concentrate produced by gold ore processing on Banska Hodrusa deposit.

[3]Reported figure.

[4]Figures were converted to barrels from production reported in thousand metric tons, which was reported as the following: Crude production: 2005—35; 2006—30; 2007—23; 2008—21; 2009—21 (estimated). Petroleum products: 2005—5,244; 2006—5,458; 2007—6,006; 2008—5,893; 2009—6,012.

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TABLE 2
SLOVAKIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners[1]	Location of main facilities	Annual capacity
Aluminum	Slovalco, a.s. (Norsk Hydro ASA, 55.3%, and ZSNP SCO, a.s., 44.7%)	Ziar nad Hronom, central Slovakia	165
Brown coal and lignite	Hornonitranske Bane Prievidza, a.s. (HBP)	Mines at Cigel, Handlova, and Novaky	2,200
Do.	Bana Dolina, a.s.	Mine east of V'lky Krtis, southern Slovakia	150
Do.	Bana Cary, a.s.	Mine at Cary, western Slovakia	500 e
Cement	Povazska Cementaren, a.s.	Ladce	NA
Do.	Cemmac a.s. (Asamer & Hufnagl Baustoff Holding Wien GmbH, 82.72%)	Horne Srnie	NA
Do.	VSH, a.s. Turna	Turna	1,300
Do.	Holcim (Slovensko), a.s.	Rohoznik	2,200
Coke	U.S. Steel Kosice, s.r.o.	Kosice, eastern Slovakia	NA
Copper, smelter, secondary	Kovohuty, a.s. [Montanwerke Brixlegg AG, 100% (A-TEC Industries AG)]	Krompachy, central Slovakia	90
Ferroalloys	OFZ, a.s. (ArcelorMittal)	Istebne	170
Gold in concentrate	Slovenska Banska, s.r.o.	Hodrusa-Hamre	NA
Iron:			
Ore	SIDERIT, s.r.o. Nizna Slana	Nizna Slana, central Slovakia	600 e
Concentrate	do.	do.	400 e
Magnesite	SMZ, a.s. Jelsava	Jelsava, eastern Slovakia	370 e
Do.	Slovmag, a.s. Lubenik (Magnezit Group)	Lubenik, central Slovakia	NA
Do.	GE.NE.S., a.s.	Mutnik, near Hnusta in central Slovakia	NA
Natural gas million cubic meters	NAFTA, a.s.	Oilfields and natural gas fields in western and eastern Slovakia	NA
Do. do.	ENGAS, s.r.o.	Brno	NA
Petroleum:			
Crude	NAFTA, a.s.	Oilfields and natural gas fields in western and eastern Slovakia	NA
Refinery	SLOVNAFT, a.s. (MOL Plc., 98.5%)	Bratislava	6,000
Do.	Petrochema, a.s.	Dubova	150
Pig iron	U.S. Steel Kosice, s.r.o.	Kosice, eastern Slovakia	4,500
Salt	Solivary, a.s. Presov	Presov, eastern Slovakia	NA
Steel, crude	U.S. Steel Kosice, s.r.o.	Kosice, eastern Slovakia	4,900
Do.	Zeleziarne Podbrezova, a.s.	Podbrezova	600 e
Zeolites	Zeocem, a.s.	Quarry near Nižný Hrabovec and processing plant near Bystre	NA
Do.	PRO-ZEO, s.r.o.	Humenne	NA

eEstimated. Do., do. Ditto. NA Not available.
[1]Abbreviations used in company names include the following: a.s., joint stock company; s r.o., limited company

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The Mineral Industry of Slovenia

By Mark Brininstool

Slovenia remained a modest producer of mineral commodities in 2009 and its output was not significant on either a world or regional scale. Slovenia's gross domestic product (GDP) decreased by 7.8% in real terms in 2009 compared with that of 2008. This was Slovenia's first annual decrease in the GDP since 1992. Mining and quarrying made up about 0.4% of the GDP and manufacturing made up about 18%. Data on the amount of mineral processing included in the category "manufacturing" were not available (Statistical Office of the Republic of Slovenia, 2010a-c).

The world financial crisis reduced demand for Slovenia's main mineral exports in 2009, and exports of mineral commodities were not significant in terms of Slovenia's total exports. Compared with that of 2008, exports of iron and steel in 2009 decreased by 36% by volume to 415,372 metric tons (t), and by 54% by value to $610 million; exports of nonferrous metals decreased by 18% by volume to 197,880 t, and by 31% by value to $550 million; and exports of nonmetallic mineral manufactures (not including energy fuels) decreased by 29% by volume to 662,603 t, and by 25% by value to $397 million. Exports of petroleum, petroleum products, and related materials increased by 12% by volume to 481,467 t, but decreased by 27% by value to $325 million. Petroleum, petroleum products, and related materials was the only significant mineral commodity import classification in terms of value; it was valued at $325 million and accounted for 8% of the total value of all imports (Statistical Office of the Republic of Slovenia, 2010a).

Production

In 2009, production decreased significantly compared with that of 2008 for all metals. Primary aluminum production decreased by 58%; secondary aluminum, by an estimated 50%; crude steel and semimanufactures, by 32% and 33%, respectively; and refined lead by 7%. Cement production decreased by an estimated 23% and production of crude oil and refinery products increased by 15% each. Reduced foreign demand for minerals and mineral products as a result of the world economic crisis was the main reason for the reduced production of metals (table 1).

Structure of the Mineral Industry

Table 2 is a list of major mineral industry facilities.

Outlook

Production of minerals and mineral products will likely continue to be modest. As a result, Slovenia is expected to remain dependent on mineral imports, notably mineral fuels. Production of most commodities, including aluminum and crude steel, will most likely increase as the European and world economies recover and demand increases for mineral commodities.

References Cited

Statistical Office of the Republic of Slovenia, 2010a, Exports and imports by the Standard International Trade Classification, Slovenia, cumulative data: Statistical Office of the Republic of Slovenia. (Accessed July 21, 2010, at http://www.stat.si/sistat/en/MainTable/tbl_2401734.)

Statistical Office of the Republic of Slovenia, 2010b, Gross domestic product, Slovenia, 4th quarter 2009: Statistical Office of the Republic of Slovenia, March 1. (Accessed July 20, 2010, at http://www.stat.si/eng/novica_prikazi.aspx?id=2980.)

Statistical Office of the Republic of Slovenia, 2010c, Value added by activity and GDP, constant prices, original data, Slovenia, quarterly: Statistical Office of the Republic of Slovenia. (Accessed July 20, 2010, at http://www.stat.si/pxweb/Dialog/Saveshow.asp.)

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TABLE 1
SLOVENIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007	2008	2009
METALS						
Aluminum:						
Primary		138,500	118,100	111,016	83,328	35,148
Secondary[e]		--	20,000	20,000	20,000	10,000
Iron and steel, metal:						
Ferroalloys, ferrosilicon[e]		15,529 [3]	12,550 [3]	6,000	--	--
Crude steel from electric furnaces		583,000	627,000	638,000	642,000 [r]	436,000
Semimanufactures		638,939	678,869	715,539	692,320	462,700
Lead, refined, secondary[e]		15,000	15,000	15,000	15,000	14,000
INDUSTRIAL MINERALS						
Cement	thousand metric tons	1,114	1,269	1,300 [r, e]	1,300 [r, e]	1,000 [e]
Clays:[e]						
Bentonite		140	130	130	130	130
Ceramic clay, crude		1,800	1,800	1,800	1,800	1,800
Pumice and related materials, volcanic tuff[e]		40,000	40,000	40,000	40,000	40,000
Salt, all sources[e]		803 [3]	1,624 [3]	2,000	2,000	2,000
Sand and gravel, excluding glass sand	thousand metric tons	12,432	17,873	21,548	19,171 [r]	19,000 [e]
Silica sands (glass sand, industrial sand)[e, 4]		350,000 [r]	350,000 [r]	350,000 [r]	353,983 [r, 3]	326,636 [3]
Stone, excluding quartz and quartzite, crude:						
Dimension[e]		15,262	15,000	15,000	15,000	15,000
Crushed stone	thousand metric tons	12,176	7,547	9,374	9,765	10,144
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Brown coal	thousand metric tons	594	588 [r]	483	489	511
Lignite	do.	3,945	3,934	4,079	4,032 [r]	3,918
Total	do.	4,539	4,522 [r]	4,562	4,521	4,429
Natural gas	thousand cubic meters	4,335	4,163	3,418	2,610	2,575
Petroleum:[e, 5]						
Crude	42-gallon barrels	2,210 [r]	2,110 [r]	2,060 [r]	1,170 [r]	994
Refinery products	do.	78,100	67,000	77,100	83,800	96,300

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. do. Ditto. -- Zero.

[1]Table includes data available through July 23, 2010.

[2]In addition to commodities listed, common clay and lime also were produced, but available information is inadequate to make reliable estimates of output.

[3]Reporterd figure.

[4]In previous years, this commodity category was listed as "Quartz, quartzite, glass sand."

[5]Figures were converted to barrels from production in metric tons, which was reported as the following: Crude production: 2005—298; 2006—284; 2007—278; 2008—158; 2009—134. Petroleum products: 2005—9,767; 2006—8,379; 2007—9,632; 2008—10,478; 2009—12,042.

TABLE 2
SLOVENIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons)

Commodity	Major operating companies	Location of main facilities	Annual capacity
Aluminum, primary and secondary	Talum d.d. Kidričevo (Elektro Slovenija d.o.o., 80%)	Smelter at Kidricevo	120 [e]
Cement	Salonit Anhovo	Plant at Anhovo	1,100 [e]
Do.	Lafarge Cement d.d. (Lafarge S.A., 56% and European Bank for Reconstruction and Development, 44%)	Plant at Trbovlje	600
Coal:			
Brown	Rudnik Trbovlje-Hrastnik d.o.o. (RTH)	Mine Rudnik Trbovlje Hrastnik near Trbovlje	NA
Lignite	Premogovnik Velenje, d.d.	Mine at Velenje	NA
Ferroalloys, ferrosilicon	TDR-Metalurgija d.d. (TDR)	Plant at Ruse	27
Lead, metal, secondary	MPI - Reciklaza Metalurgija, plastika in inženiring d.o.o.	Smelter and refinery at Zerjav	35
Petroleum, refined	Nafta Lendava	Refinery at Lendava	14
Salt	SOLINE Pridelava soli d.o.o.	Salt pans at Sečovlje and Strunjan	2
Steel, crude	Acroni, d.o.o. [Slovenska Industrija Jekla d.d. (SIJ), 100%]	Plant at Jesenica	400
Do.	Metal Ravne d.o.o. [Slovenska Industrija Jekla d.d. (SIJ), 100%]	Plant at Ravne	130 [e]
Do.	Štore Steel d.o.o. (Unior d.d., 54%)	Plant at Store	185 [e]

[e]Estimated; Do., Ditto; NA Not available.

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THE MINERAL INDUSTRY OF SPAIN

By Alfredo C. Gurmendi

In 2009, Spain was a significant European producer of mineral commodities, such as celestite (second after China), cement (ninth after China, India, the United States, Japan, Russia, the Republic of Korea, Iran, and Italy), fluorspar (sixth after China, Mexico, Mongolia, Russia, and South Africa), gypsum (third after the China and Iran), and sand and gravel (industrial) (sixth after the United States, Italy, Germany, the United Kingdom, and Australia) (Crangle, 2010; Dolley, 2010; Miller, 2010; Moores, 2010; van Oss, 2010).

The Iberian Pyrite Belt (IPB) is an area known to host numerous multimillion-metric-ton base-metal deposits, which contained about 2 billion metric tons (Gt) of sulfide ore reserves. The mined ores thus far produced included, in order of value, 880 metric tons (t) of gold, 35 million metric tons (Mt) of zinc, 13 Mt of lead, and 15 Mt of copper. The IPB, which is more than 240 kilometers (km) in length, extends from Seville in southwestern Spain to south of Lisbon in Portugal. The most important IPB geologic sequence is the Volcanic Sedimentary (VS) sequence, which hosts massive sulfide and associated stockwork deposits and dates from the Late Devonian to Middle Carboniferous periods. The VS varies in thickness from a few meters to several hundred meters and consists of a sequence of bimodal volcanics and associated pyroclastic and tuffaceous rocks. The leading polymetallic deposits include the Aznalcollar, the Lomero-Poyatos, the Rio Tinto, the Scotiel, and the Tharsis deposits (Cambridge Mineral Resources plc, 2010a).

Minerals in the National Economy

The international financial crisis and its consequences for the global economy have definitively altered the Spanish economy. In 2009, Spain's real gross domestic product (GDP) growth was -3.6% compared with 0.9% in 2008. This decrease was owing to the global economic recession, which began in late 2008. Spain's inflation was -0.3% in 2009 compared with 4.1% in 2008; inflation slowed markedly in the closing months of the year largely owing to the decrease in commodity prices but also to the notable weakening of domestic demand.

Spain had a population of 46.7 million inhabitants in 2009. The total labor force was 23.1 million; of this total, services employed 66.4% of the labor force; industry, 16.3%; construction, 13.1%; and agriculture, 4.2%. The mineral sector contributed 1% of Spain's GDP and employed about 0.5% (76,500) of the services total (15.3 million). The country's industrial minerals output had decreased by 50% since 2007 owing to the global economic crisis that affected major end markets for construction materials and ceramics (Banco de España, 2010, p. 24-25; International Monetary Fund, 2010, p. 32; Mañana, 2010, p. 10, 25; Ministerio de Economía y Hacienda, 2010, p. 17, 21; Moores, 2010; U.S. Central Intelligence Agency, 2010; U.S. Department of State, 2010).

Government Policies and Programs

Minerals are owned by the state under an arrangement known as the Regalía Principal. The Mining Law of July 21, 1973, and the Hydrocarbon Law of October 7, 1998, govern the mineral industry of Spain. The Dirección General de Política Energética y Minas implements these mineral laws. Law 20 of June 5, 2006, modified the Finance Regime of the Sociedad Estatal de Participaciones Industriales (SEPI), which is a Government-owned holding company that has mining as one sector in its portfolio. In the mineral sector, SEPI owned 100% of Hulleras del Norte, S.A. (HUNOSA), which produced coal; 100% of Minas de Almadén y Arrayanes, S.A. (MAYASA), which produced mercury; 60% of Enusa Industrias Avanzadas, S.A. (ENUSA), which produced nuclear energy; 20% of Red Eléctrica Corporación, S.A. (RECSA), which produced electricity; and 5% of Enagás, S.A. (ENAGAS), which produced natural gas. The Instituto Geológico y Minero de España (IGME) is the principal Government mineral-resource agency. IGME offers assistance in the fields of geology and mining to the private and public sectors through the production of maps and scientific publications (Sociedad Estatal de Participaciones Industriales, 2010, p. 24-25).

Production

Production data for selected mineral commodities are in table 1. The estimated level of production remained the same in 2009 as in 2008 for primary aluminum metal (408,000 t) and refined copper (290,000 t). Reported production of secondary lead metal remained the same as in 2008 (125,000 t), and reported production of secondary zinc metal increased to 500,776 t from 456,000 t in 2008. Mine production of nickel concentrate decreased to 8,035 t from 8,140 t in 2008; fluorspar content production decreased to 122,408 t from 148,736 t in 2008. Production of limestone, which accounted for a significant share of the mineral production in Spain, remained at the same level as that of 2008 (270 Mt). Calcinated magnesite production was 163,930 t in 2009 compared with 187,626 t in 2008, which was a 12.6% decrease. The country was a leading European Union (EU) producer of natural sodium sulfate, slate, and strontium minerals, and a regionally significant processor of domestic and imported raw materials. In 2009, Spain's energy production was from natural gas (42.1%), nuclear (27.6%), coal (17.8%), and hydropower (12.5%). Spain's energy consumption sources were petroleum (50%), natural gas (24.7%), nuclear (10.9%), coal (9.6%), and hydropower (4.8%) (BP p.l.c, 2010, p. 41; Ministerio de Industria, Turismo y Comercio, 2010, p. 19, 43; Moores, 2010).

Structure of the Mineral Industry

The structure of Spain's mineral industry is listed in table 2. Since early 1986, Spain has been opening its economy to trade

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and investment, modernizing its industrial base, improving its infrastructure, and revising its laws to conform to EU guidelines (Banco de España, 2010, p. 18). The mineral industry was made up of a mix of state-owned companies, joint ventures of state and private-sector companies, and privately owned companies. In Spain, Cambridge Mineral Resources plc (CMR) owned 100% of its local subsidiary Recursos Metállicos SA (Recursos), which held the mining licenses for the Lomero-Poyatos auriferous polymetallic massive sulfide deposit, including the right to production. The licenses were valid for 45 years (Cambridge Mineral Resources plc, 2010b).

In September 2009, Orvana Minerals Corp. (OMC) of Canada acquired Kinbauri Gold Corp. of Canada. OMC owned El Valle-Boinas/Carles copper and gold skarn deposits in the Rio Narcea gold belt in northern Spain, close to the port city of Aviles. The deposits had estimated measured and indicated reserves of 6.4 Mt grading 4.7 grams per metric ton (g/t) gold and 0.80% copper and inferred resources of 7.3 Mt grading 5.4 g/t gold and 0.45% copper (Orvana Minerals Corp., 2010). Ormonde Mining Plc (Ormonde) of Ireland was developing mining projects in Spain, including the Barruecopardo tungsten project in Salamanca Province in western Spain. Ormonde's progress towards the development of Barruecopardo continued during the year, with an assessment of mining operations, metallurgical work, and preparation of documentation required for the project permitting process. La Zarza copper-gold-zinc project is located in Huelva Province in the IPB mining district, which is host to major base-metal mining operations at Aguas Teñidas, Las Cruces, and Neves Corvo and other major mineral deposits, including Rio Tinto and Tharsis. On October 27, 2009, Ormonde reported that a joint-venture agreement for La Zarza copper-gold project had been signed with the Chilean copper producer Antofagasta Minerals S.A. (AMSA). AMSA had the right to earn a 51% interest in La Zarza during a 3-year period by spending $7 million on additional exploration and subsequent evaluation activities, with a minimum commitment of $1 million in 2010. AMSA would have the right to increase its interest to 75% after the completion of a feasibility study on La Zarza (Ormonde Mining Plc, 2010a, p. 6-8).

Alcoa Inc. of the United States had eight production centers across Spain. Alcoa was the leading alumina and aluminum producer in Spain, the sole producer of aluminum oxide (alumina) and primary aluminum, and a manufacturer of rolled products with those materials (Alcoa Inc., 2010b).

In terms of the value of mine output of metallic and nonmetallic minerals and quarry products, Spain was one of the leading EU countries. Spain's Provinces of Andalusia, Asturias, and Cataluña had expressed interest in the development of mineral resources in their geographic areas similar to that being done in the Provinces of Salamanca and Zamora (Sociedad Estatal de Participaciones Industriales, 2010, p. 10-11, 26).

Mineral Trade

In 2009, foreign trade accounted for about 49% of Spain's GDP; exports, about 23.3%; and imports, 25.7% compared with 59.3%, about 32.8%, and 26.5%, respectively, in 2008. Mineral fuels and derivatives accounted for almost 4.2% of total exports and almost 12.5% of total imports; aluminum accounted for 1% of total exports and 0.8% of total imports; iron and steel, 2.7% of total exports and 3.6% of total imports; industrial minerals, 2.2% of total exports and 2.5% of total imports; and base metals, 2% of total exports and 1.7% of total imports. Spain's top export partners were France (18.2%), Germany (10.5%), Portugal (8.8%), Italy (8%), and the United Kingdom (7.1%). The country's top import partners were Germany (13.9%), France (11.1%), Italy (7.7%), China (7.2%), and the United Kingdom (4.6%) (Federation of International Trade Associations, The, 2010).

Commodity Review

Metals

Bauxite and Alumina and Aluminum.—Alcoa World Alumina and Chemicals Inc. (AWAC) (Alcoa Inc., 60%, and Alumina Ltd. of Australia, 40%), which was the world's leading alumina producer, owned and operated the San Ciprian alumina refinery, which was located in Lugo Province on the east coast of Spain. San Ciprian had an annual production capacity of 1.5 Mt. Bauxite for the refinery was imported from Boke, Guinea. Approximately 70% of San Ciprian's alumina was supplied to Alcoa's aluminum smelters in Spain and the remaining production was largely sold as hydrated alumina to European chemical manufacturers. San Ciprian's location allows commodity-grade alumina to be sold within the EU without the high tariffs imposed on non-European suppliers. In 2009, the San Ciprian complex produced 1.3 Mt of aluminum oxide and 250,000 t of primary aluminum as ingots for casting, billets for extrusion, and sheets for lamination. The alumina output was used for the production of primary aluminum and chemical aluminum oxides for the ceramics and chemistry sectors. Alumina, alumina chemicals, alumina hydrates, and primary aluminum were produced by Aluminio/Alumina Español, S.A. (AESA) in San Ciprian for domestic consumption and for export; primary aluminum was produced by Alcoa Inespal S.A. (AlSA) in the Provinces of Aviles and La Coruña, also for domestic consumption and for export. AESA was owned by AWAC, and AlSA was a subsidiary of Alcoa (100%) (Alcoa Inc., 2010a, p. 7, 9; 2010b; Alumina Ltd., 2010).

Copper, Gold, and Silver.—In 2009, Inmet Mining Corp. of Canada acquired 70% interest in Las Cruces copper project, and Leucadia National Corp. retained the remaining 30% interest. Las Cruces is a high-grade volcanic massive sulfide copper deposit located on the eastern edge of the IPB about 15 km northwest of Seville. The project had estimated proven and probable copper reserves of 17.6 Mt grading 6.2% copper. Las Cruces production capacity was 72,000 metric tons per year (t/yr) of copper cathode as an end product and 1.0 Mt of copper ore for the period 2009-24. As of December 31, 2009, however, Las Cruces Mine had produced only 209,000 t of ore grading 6% copper and 5,600 t of copper cathode owing to startup issues and equipment failures, which were expected to be addressed by early 2010 (Inmet Mining Corp., 2010a, p. 31-33; 2010b).

CMR's Lomero-Poyatos auriferous polymetallic massive sulfide deposit, which is located near San Telmo, was reported

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to contain estimated reserves of 3.71 Mt at grades of, in order of value, 3.26 g/t gold, 27.9 g/t silver, 0.87% copper, 1.57% lead, and 1.16% zinc. CMR was seeking joint-venture partners to develop this project. Ormonde sought to build a mid-size suite of projects in Spain that would be focused primarily on the Salamanca and the Zamora gold exploration projects. The Salomon project, which was located in northwestern Spain, was the most advanced project and contained an estimated 20,000 kilograms (kg) of inferred resources of gold (Cambridge Mineral Resources plc, 2010a, b; Ormonde Mining plc, 2010a, p. 10; 2010d).

Spain's silver production remained at about the same level as that of 2008 (3,400 kg). According to Ormonde, La Zarza copper-gold project's indicated mineral resources amounted to 9.9 Mt grading 1% copper, 1% lead, 3% zinc, 1.6 g/t gold, and 38.9 g/t silver, and its inferred resources were 1.3 Mt grading 1.9% copper (Ormonde Mining plc, 2010a, p. 12-13; 2010c).

Iron and Steel.—Spain produced 19 Mt of crude steel in 2009, which was about the same amount as in 2008. Compañia Española de Laminación S.A. (Celsa) produced more than 2.4 million metric tons per year (Mt/yr) of steel in 2009. Celsa produced corrugated and smooth round rods, rolled wire, flat rods, squares, angle rods, structural sections, and electro-welded mesh (Compañia Española de Laminación, S.A., 2010a, p. 16-17, 37; 2010b).

Sidenor Industrial, S.L. (Sidenor), which was a leading producer of special steels in Spain, was planning to start producing stainless steel by modernizing the electric arc furnace at its works at Basauri in northern Spain (Sidenor Industrial, S.L., 2010).

Nickel.—According to Lundin Mining Corp. (LMC) of Canada, its Aguablanca nickel-copper deposit (which is located in southwestern Spain in the Province of Badajoz) consisted of an open pit and a processing facility with a production capacity of 1.9 Mt/yr of ore. The initial open pit mine life was estimated to be 10.5 years based on mineral reserves of 15 Mt of ore containing 0.6% nickel, 0.5% copper, 0.47 g/t platinum-group metals, and 0.13 g/t gold. In 2009, the Aguablanca Mine produced 1.4 Mt of ore grading 0.5% nickel and 0.4% copper, and concentrates containing 8,029 t of nickel and 6,989 t of copper (Lundin Mining Corp., 2010a, p. 7; 2010b).

Tungsten.—The Barruecopardo tungsten project in the Salamanca area of western Spain is one of the high-grade undeveloped tungsten projects in the world outside of China. The project is owned by a joint venture of Ormonde (90%) and Government-owned Siemcalsa S.A. (10%). The Barruecopardo tungsten project's indicated and inferred mineral resource amounted to 10.9 Mt grading 0.45% tungsten trioxide (WO_3). The initial production rate was expected to be 400,000 t/yr to produce between 130,000 and 150,000 t/yr of WO_3, which equates to between 1,000 and 1,200 t/yr of tungsten metal to be produced by 2012. Ormonde would also assess the volume, grade, and rate of recovery of the tungsten contained in the dumps and tailings. Recent sampling by Ormonde confirmed the presence of gold with the tungsten, and the company would evaluate that resource as well (Ormonde Mining plc, 2010a, p. 2-3; 2010b).

Zinc.—Spain's zinc metal output was 500,776 t compared with 456,050 t in 2008. Asturiana de Zinc S.A. continued production at its San Juan de Nieva Castillon plant. Asturiana's core business was the refining and production of zinc metal, mainly zinc ingots. According to Asturiana, the San Juan de Nieva plant, which had a capacity of 500,000 t/yr of zinc metal, was the leading single zinc smelter in the world and also one of the world's lowest-cost operations. CMR's Lomero-Poyatos mineralization contains resources of almost 5.0 Mt grading 2.7 g/t gold, 24.0 g/t silver, 0.9% copper, 1.3% lead, and 1% zinc. Masa Valverde's zinc and copper mineralization contains resources of almost 12 Mt of zinc grading 3% zinc; 80 Mt of copper grading 0.5% copper; and 16.2 Mt of gold grading 1 g/t gold (Asturiana de Zinc S.A., 2009; Cambridge Mineral Resources plc, 2010b).

Industrial Minerals

Cement.—Spain's cement output remained at about the same level as in 2008 (54 Mt). S.A. Tudela Veguín planned to boost its white cement production rate to 900 metric tons per day (t/d) from 700 t/d while achieving a significant emission reduction by modernizing its Tudela plant near Madrid. All the plant's components had been designed to increase its production capacity. The degree of cement whiteness had to be absolutely high rate (Polysius AG, 2010).

Fluorspar.—Spain's fluorspar output amounted to 122,408 t in 2009 compared with 148,736 t in 2008, which was almost an 18% decrease. Minerales y Productos Derivados, S.A. (MINERSA), which was the EU's leading fluorspar producer, operated three fluorite deposits in Asturias in the north of Spain. MINERSA's production capacity was 150,000 t of fluorspar concentrates, mainly acid grade, as well as metallurgic and ceramic grades. The fluorspar operations were located close to the deepwater Port of Aviles. The Emilio, the Jaimina, and the Moscona underground mines produced a combined 420,000 t/yr of crude ore fluorspar (Minerales y Productos Derivados S.A., 2010).

Potash.—Iberpotash S.A. (a business unit of ICL Fertilizers Europe) was a leading producer of potash and an important potash resource in the EU. In 2009, Iberpotash mined more than 1 Mt of red potash for fertilizers from two mines in the Province of Catalonia (Iberpotash S.A., 2010).

Sepiolite.—Spain's sepiolite output was 770,007 t in 2009 compared with 707,950 t in 2008, which was almost a 9% increase. The Tolsa Group, which was based in Toledo, was the EU's leading producer of sepiolite and the owner of the world's leading sepiolite deposit. The company's reserves of sepiolite in the River Tajo Basin were thought to be in excess of 15 Mt. The Tolsa Group was the discoverer of sepiolite, which is a light mineral with a high capacity of absorption that is used in a variety of products and applications (Grupo Tolsa S.A., 2010).

Mineral Fuels and Other Sources of Energy

Spain has limited energy resources; thus, the country was quite dependent upon imports of energy. Spain had no major oilfields, one natural gas field located offshore, and coal mines that contained mainly low-quality coal. In 2009, proved petroleum reserves were estimated to be 150 million barrels;

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natural gas proved reserves were estimated to be 2.5 billion cubic meters; and coal reserves were estimated to be 530 Mt. Spain's refinery capacity was almost 1.4 million barrels per day (BP p.l.c., 2010, p. 18; U.S. Energy Information Administration, 2010).

Crude Oil and Natural Gas.—Spain's production of crude oil decreased to 250,000 barrels in 2009 from 298,000 barrels (revised) in 2008, and revised natural gas production decreased to 19,796 million cubic meters in 2009 from 46,354 million cubic meters in 2008. Owing to the lack of significant domestic crude oil output, Spain depended on imports from Russia (16%); Iran, Libya, and Saudi Arabia (11% each); Mexico (10%); Nigeria (8%); and other countries (33%). Most of Spain's natural gas production came from one offshore field, Poseidon, which was operated by Repsol YPF, S.A. The country's natural gas imports were from Algeria (34%), Nigeria (21%), Qatar (13%), Trinidad and Tobago (12%), and other countries (20%). The country produced about 230 billion kilowatts of electricity and consumed about 220 billion kilowatts. The largest share of electricity generation came from conventional thermal plants (52%), hydroelectricity (25%), nuclear (15%), and other renewables (8%). Electricity consumption had grown considerably and had strained the electricity infrastructure; several major blackouts were attributed to supply shortages or transmission grid malfunction. In 2009, the largest share of energy consumption came from crude oil (55%), followed by natural gas (20%), nuclear (9%), coal (8%), hydroelectricity (5%), and other renewables (3%) (BP p.l.c., 2010, p. 41; Ministerio de Industria, Turismo y Comercio, 2010, p. 17, 23, 39; U.S. Energy Information Administration, 2010).

Coal.—Spain's coal production decreased to more than 9.8 Mt in 2009 from almost 10.1 Mt in 2008. Coal continued to be Spain's most plentiful indigenous energy source; however, no production of lignite was reported in 2009. In 2009, proved reserves of anthracite and bituminous amounted to 200 Mt and subbituminous and lignite amounted to 330 Mt, or a total of 530 Mt. Spain's coal consumption decreased to 10.6 Mt in 2009 from 15.6 Mt in 2008 (BP p.l.c., 2010, p. 32, 34, 35; Ministerio de Industria, Turismo y Comercio, 2010, p. 20, 35).

Private companies produced most of the coal in the country, although the leading producer of bituminous coal was the HUNOSA Group, which was owned by the Government through the SEPI, and the leading producer of lignite was Empresa Nacional de Electricidad S.A. (Ministerio de Industria, Turismo y Comercio, 2010, p. 17).

Renewable Energy.—In Europe, Germany and Spain continued to attract the majority of investments in wind power. In 2008, the wind power production capacity of the two countries totaled 40,643 megawatts (MW), which was 62.6% of the EU's total capacity of 64,935 MW. The leading European countries with wind power installations were Germany (23,903 MW), Spain (16,740 MW), Italy (3,736 MW), France (3,404 MW), the United Kingdom (3,241 MW), Denmark (3,180 MW), Portugal (2,862 MW), Sweden (1,021 MW), and Ireland (1,002 MW) (European Wind Energy Association, 2010, p. 3, 6; Instituto Nacional de Estadística, 2010).

Outlook

Spain continued to be a significant producer of such mineral commodities as, in terms of volume, coal, iron, pyrites, copper, lead, zinc, tungsten, uranium, potash, and chloride. The country has one of Europe's most important and diversified mining sectors, which produces mostly industrial minerals and stone. Spain's mining output is not sufficient to satisfy domestic demand, however, and the country continues to be a large-scale importer of fuel minerals. Although the Spanish mining sector remained stagnant in 2009, it is expected to recover when Spain's base- and precious-metal, nickel, and tungsten projects complete their feasibility studies, most of which are focused on the IPB. The IPB continues to be of interest to domestic and foreign mining companies and is a prime target for exploration activities because of past successes in the discovery of large volcanic-hosted massive sulfide deposits. Owing to the country's higher dependence on imported energy sources, Spain is likely to direct its attention toward biofuels, clean coal, and renewable energy investments, and the Government is expected to support projects related to biofuels. Despite Spain's significant economic growth, some risks remain, including the country's continued loss of competitiveness and a decline in EU structural funds and foreign direct investment (Federation of International Trade Associations, The, 2010; Instituto Nacional de Estadística, 2010).

References Cited

Alcoa Inc., 2010a, 2009 annual report and Form 10-K: Alcoa Inc., 178 p. (Accessed July 26, 2010, at http://www.alcoa.com/global/en/investment/pdfs/2009_Annual_Report.pdf.)

Alcoa Inc., 2010b, Alcoa in Spain: Alcoa Inc. (Accessed August 11, 2010, at http://www.alcoa.com/spain/en/info_page/home.asp.)

Alumina Ltd., 2010, Global operations, Spain—San Ciprian refinery: Alumina Ltd. (Accessed August 12, 2010, at http://www.aluminalimited.com/global-operations/.)

Asturiana de Zinc S.A., 2009, Asturiana de Zinc—Informe anual 2008: Asturiana de Zinc S.A. (Accessed August 25, 2010, at http://www.azsa.es/index_eng.html.)

Banco de España, 2010, Annual report 2009: Banco de España, 45 p. (Accessed July 22, 2010, at http://www.bde.es/informes/be/infanu/2009/balancee.pdf.)

BP p.l.c., 2010, BP statistical review of world energy: London, United Kingdom, BP p.l.c, June, 50 p. (Accessed August 9, 2010, at http://www.bp.com/liveassets/bp_internet/globalbp/globalbp_uk_english/reports_and_publications/statistical_energy_review_2008/STAGING/local_assets/2010_downloads/statistical_review_of_world_energy_full_report_2010.pdf.)

Cambridge Mineral Resources plc, 2010a, Geology and mining in Spain: London, United Kingdom, Cambridge Mineral Resources plc. (Accessed July 21, 2010, at http://www.cambmin.co.uk/?i=intro&s=miningspain.)

Cambridge Mineral Resources plc, 2010b, Spain—Lomero Poyatos deposit: London, United Kingdom, Cambridge Mineral Resources plc. (Accessed August 10, 2010, at http://www.cambmin.co.uk/?i=projects&s=spa.)

Compañía Española de Laminación, S.A., 2010a, Informe de Sostenibilidad—CELSA Group: Compañía Española de Laminación, S.A., 48 p. (Accessed August 14, 2010, at http://www.celsagroup.com/pdf/es/Informe_sostenibilidad.pdf.)

Compañía Española de Laminación, S.A., 2010b, Manufacturing process—Celsa Barcelona, España: Compañía Española de Laminación, S.A. (Accessed August 14, 2010, at http://www.celsa.com/Celsa.mvc/Presentacion.)

Crangle, R.D., Jr., 2010, Gypsum: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 70-71.

Dolley, T.P., 2010, Sand and gravel (industrial): U.S. Geological Survey Mineral Commodity Summaries 2010, p. 138-139.

Digitized by Google

European Wind Energy Association, 2010, Statistics: Brussels, Belgium, World Energy Association, 9 p. (Accessed August 28, 2010, at http://www.ewea.org/fileadmin/ewea_documents/documents/statistics/100401_General_Stats_2009.pdf.)

Federation of International Trade Associations, The, 2010, Spain information: The Federation of International Trade Associations. (Accessed August 12, 2010, at http://www.fita.org/countries/spain.html?ma_rubrique_economie.)

Grupo Tolsa S.A., 2010, Raw materials—Sepiolite: Grupo Tolsa. (Accessed August 28, 2010, at http://www.tolsa.com/ingl/materias_primas/iframe_sepiolita.html.)

Iberpotash S.A., 2010, Spain—About Iberpotash: Iberpotash S.A. (Accessed August 28, 2010, at http://www.iberpotash.com/.)

Inmet Mining Corp., 2010a, Annual report 2009: Inmet Mining Corp., 128 p. (Accessed August 14, 2010, at http://www.inmetmining.com/Theme/Inmet/files/200920Annual20Report.pdf.)

Inmet Mining Corp., 2010b, Our operations—Production—Las Cruces, Spain: Inmet Mining Corp. (Accessed August 14, 2010, at http://www.inmetmining.com/ouroperations/production/LasCruces/default.aspx.)

Instituto Nacional de Estadística, 2010, Industria y energía 2009: Instituto Nacional de Estadística, July, 8 p. (Accessed July 26, 2010, at http://www.ine.es/revistas/cifraine/0709.pdf.)

International Monetary Fund, 2010, World economic outlook: International Monetary Fund, May, 67 p. (Accessed July 21, 2010, at http://www.imf.org/external/pubs/ft/reo/2010/EUR/eng/ereo0510.pdf.)

Lundin Mining Corp., 2010a, Annual information form: Lundin Mining Corp., March 31, 52 p. (Accessed August 19, 2010, at http://www.lundinmining.com/i/pdf/2009-Mar-AIF.pdf.)

Lundin Mining Corp., 2010b, Operating statistics—Aguablanca, Spain: Lundin Mining Corp. (Accessed August 19, 2010, at http://www.lundinmining.com/s/QOU.asp?ReportID=390111.)

Mañana, Ramón, 2010, Un Ensayo de Prospectiva—La industria en el futuro de la economía española, 2010-16, Industria y Minería: Consejo Superior de Colegios de Ingenieros de Minas, Boletín, no. 381, September 2009, 64 p.

Miller, M.M., 2010, Fluorspar: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 56-57.

Minerales y Productos Derivados S.A., 2010, MINERSA fluorspar operations in Avilés: Asturias, Spain, Minerales y Productos Derivados S.A. (Accessed August 28, 2010, at http://www.grupominersa.es/minersa/gencontent.aspx/actividades-139/operaciones-de-fluorita-155.)

Ministerio de Economía y Hacienda, 2010, Síntesis de indicadores económicos 2010: Ministerio de Economía y Hacienda, June, 38 p. (Accessed July 26, 2010, at http://serviciosweb.meh.es/apps/dgpe/TEXTOS/SIE/siepub.pdf.)

Ministerio de Industria, Turismo y Comercio, 2010, Secretaría de Estado de Energía: Coyuntura Energética, Boletín Trimestral, no. 60, fourth trimester 2009, 55 p.

Moores, Simón, 2010, Industrial minerals—Spain output halves in 2 years: Industrial Minerals, May 27. (Accessed June 20, 2010, at http://www.indmin.com/Article/2579790/Spain-output-halves-in-2-years.html.)

Ormonde Mining plc, 2010a, Annual report and accounts 2009: Ormonde Mining plc., 64 p. (Accessed August 11, 2010, at http://ormondemining.com/uf/Annual20Reports/AnnualReport2009.pdf.)

Ormonde Mining plc, 2010b, Barruecopardo tungsten project: Ormonde Mining plc. (Accessed August 11, 2010, at http://ormondemining.com/projects/barr.html.)

Ormonde Mining plc, 2010c, La Zarza copper-gold project: Ormonde Mining plc. (Accessed August 11, 2010, at http://ormondemining.com/projects/lazcoppergold.html.)

Ormonde Mining plc, 2010d, Salamanca & Zamora gold exploration: Ormonde Mining plc. (Accessed August 11, 2010, at http://ormondemining.com/projects/Salamanca_zamora/summary.)

Orvana Minerals Corp., 2010, El Valle-Boinás/Carlés gold-copper project: Orvana Minerals Corp. (Accessed August 11, 2010, at http://www.orvana.com/projects/el-valle/index.html.)

Polysius AG, 2010, Polysius—White cement plant in Spain: Polysius AG. (Accessed August 28, 2010, at http://www.polysius.com/Modernisation-of-a-white-cemen.292.0.html?&L=1.)

Sidenor Industrial, S.L., 2010, The leading producer of special steels in Spain: Sidenor Industrial, S.L. (Accessed August 28, 2010, at http://www.sidenor.com/quienes.asp?lan=en.)

Sociedad Estatal de Participaciones Industriales, 2010, Informe anual 2009: Sociedad Estatal de Participaciones Industriales, 190 p.

U.S. Central Intelligence Agency, 2010, Spain, *in* The world factbook: U.S. Central Intelligence Agency, June 24. (Accessed July 23, 2010, at https://www.cia.gov/library/publications/the-world-factbook/geos/sp.html.)

U.S. Department of State, 2010, Spain: U.S. Department of State background note, December 28. (Accessed July 23, 2010, at http://www.state.gov/r/pa/ei/bgn/2878.htm.)

U.S. Energy Information Administration, 2010, EIA—International energy data and analysis for Spain: U.S. Energy Information Administration, July 14. (Accessed July 23, 2010, at http://tonto.eia.doe.gov/country/country_energy_data.cfm?fips=SP.)

van Oss, H.G., 2010, Cement: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 38-39.

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TABLE I

SPAIN: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008	2009[e]
METALS						
Aluminum:						
Alumina[e, 2]		1,000,000	1,000,000	1,500,000 [3]	1,500,000	1,500,000
Metal:						
Primary		394,200	349,000	408,000 [3]	408,000	408,000
Secondary		242,600	242,600	243,000	243,000	243,000
Total		636,800	591,600	651,000	651,000	651,000
Copper:						
Mine output, Cu content		4,892	6,616	6,508 [r]	7,067 [r]	6,987 [4]
Metal:						
Blister:						
Primary		284,200	263,700	258,291 [5]	259,900 [5]	260,000 [4]
Secondary[e]		10,000 [4]	10,000	10,000	10,000 [e]	10,000
Total		294,200	273,700	268,291	270,000 [e]	270,000
Refined:						
Primary		267,300	255,400	255,000 [e]	255,000 [e]	255,000
Secondary[e]		35,000 [4]	35,000	35,000	35,000	35,000
Total[e]		302,300 [4]	290,000	290,000	290,000	290,000
Germanium oxide, Ge content[e]	kilograms	5,000	5,000	5,000	5,000	5,000
Gold, mine output, Au content	do.	3,971	3,421	3,500	3,400	3,400
Iron and steel, metal:[e]						
Pig iron	thousand metric tons	4,200 [4]	4,200	4,200	4,200	4,200
Ferroalloys, electric furnace	do.	180 [4]	180	180	180	180
Steel:						
Crude	do.	17,800 [4]	18,400 [4]	19,000	19,000	19,000
Hot rolled	do.	15,000	15,000	15,000	15,000	15,000
Lead, metal, refined, secondary		110,000	129,000 [5]	128,000 [5]	125,000 [5]	125,000 [5]
Nickel, Ni content of concentrate		5,386	6,398	6,772 [r]	8,136	8,035 [4]
Silver, mine output, Ag content	kilograms	2,749	2,369	3,400	3,400	3,400
Zinc, metal, primary and secondary		506,230	507,440	494,090	456,050	500,776 [4]
INDUSTRIAL MINERALS						
Barite, $BaSO_4$		38,000	45,000	26,770 [r]	11,100 [r]	2,814 [4]
Cement, hydraulic	thousand metric tons	50,347 [4]	54,048 [r]	54,720 [r]	42,088 [r]	29,505
Clays:						
Attapulgite[e]		20,000	20,000	20,000	20,000	20,000
Bentonite		105,000	154,746	147,253 [r]	154,534 [r]	140,000
Kaolin, washed		456,000	464,049	489,428 [r]	355,739 [r]	300,000
Other[e]	thousand metric tons	15,000	15,000	15,000	15,000	15,000
Diatomite and tripoli		44,000	52,000	50,000	50,000	50,000
Feldspar		650,000	674,000	683,134 [r]	690,256 [r]	550,000
Fluorspar, CaF_2 content:						
Acid-grade		133,495	135,864	132,760 [r]	127,300 [r]	111,810 [4]
Ceramic-grade		--	--	14,474 [4]	15,930 [4]	6,485 [4]
Metallurgical-grade		10,500	17,241	4,963 [r]	5,506 [r]	4,113 [4]
Total		143,995	153,105	152,197 [r]	148,736 [r]	122,408 [4]
Gypsum and anhydrite, crude[e]	thousand metric tons	13,000	14,500 [4]	15,000	15,000	15,000
Lime, hydrated and quicklime[e]	do.	1,818 [4]	2,000	2,000	2,000	2,000
Magnesite, calcined		150,000	150,000	196,776 [r]	187,626 [r]	163,930 [4]
Mica		10,000	4,496	5,569 [r]	4,254 [r]	4,000
Nitrogen, N content of ammonia	thousand metric tons	400 [4]	400	400	400	400
Pigment, mineral:[e]						
Ocher		140,000	140,000	140,000	140,000	140,000
Red iron oxide		1,500	1,500	1,500	1,500	1,500

See footnotes at end of table.

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TABLE 1—Continued

SPAIN: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008	2009[e]
INDUSTRIAL MINERALS—Continued						
Potash, K_2O equivalent[e]		575,000	435,191 [4]	435,000	435,000	435,000
Pumice[e]		600,000 [4]	600,000	600,000	600,000	600,000
Salt:						
Rock, including byproduct from potash works		3,200	2,834	2,850	2,850	2,850 [4]
Marine and other	thousand metric tons	1,350 [e]	1,469	1,332 [r]	1,291 [r]	1,208 [4]
Sand and gravel, silica sand[6]	do.	135,000 [e]	130,000	134,000	134,000	134,000 [4]
Sepiolite, meerschaum		800,000 [e]	800,000 [e]	717,700 [r]	707,950 [r]	770,007 [4]
Sodium compounds, n.e.s.:[e, 7]						
Soda ash, manufactured	thousand metric tons	500	500	500	500	500
Sulfate, natural:						
Glauberite, Na_2SO_4 content		9,500,000	9,500,000	9,500,000	9,500,000	9,500,000
Thenardite, Na_2SO_4 content		165,000	165,000	165,000	165,000	165,000
Manufactured		125,000	125,000	125,000	125,000	125,000
Stone:[e]						
Chalk	thousand metric tons	1,000	1,000	1,000	1,000	1,000
Dolomite	do.	15,000	15,000	15,000	15,000	15,000
Limestone	do.	270,000	270,000	270,000	270,000	270,000
Marble, ornamental	do.	2,620	2,600	2,600	2,600	2,600
Marl	do.	10,000	10,000	10,000	10,000	10,000
Basalt	do.	5,000	5,000	5,000	5,000	5,000
Granite, ornamental	do.	2,500	2,500	2,500	2,500	2,500
Ophite	do.	4,000	4,000	4,000	4,000	4,000
Phonolite	do.	1,800	1,800	1,800	1,800	1,800
Porphyry	do.	1,100	1,100	1,100	1,100	1,100
Quartz	do.	1,100	1,100	1,100	1,100	1,100
Quartzite	do.	2,800	2,800	2,800	2,800	2,800
Sandstone	do.	3,400	3,400	3,400	3,400	3,400
Slate	do.	1,200	1,200	1,200	1,200	1,200
Other	do.	900	900	900	900	900
Strontium minerals, Sr_2O_4 content[e]		188,000	188,000	188,000	188,000	188,000
Sulfur, byproduct:[e]						
Metallurgy	thousand metric tons	500	500	500	500	500
Petroleum	do.	115	100	100	100	100
Coal (lignite) gasification	do.	1	1	1	1	1
Total	do.	616	601	601	601	637
Talc and steatite[e]		110,000	100,000	100,000	100,000	100,000
MINERAL FUELS AND RELATED MATERIALS						
Coal, marketable:						
Anthracite	thousand metric tons	8,553	8,353 [r]	7,872 [r]	7,238 [r]	6,952 [4]
Bituminous	do.	3,214	3,223 [r]	3,128 [r]	2,890 [r]	2,892 [4]
Lignite	do.	7,587	6,822 [r]	6,180	--	--
Total	do.	19,354	18,398 [r]	17,180 [r]	10,128 [r]	9,844 [4]
Coke, metallurgical[e]	do.	2,500	2,500	2,500	2,500	2,500
Gas, natural						
Produced	thousand cubic meters	169,000	117,916	41,741 [r]	46,354 [r]	19,726 [4]
Marketed[e]	do.	330,000	330,000	330,000	330,000	330,000
Peat[e]		60,000	60,000	60,000	60,000	60,000

See footnotes at end of table.

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TABLE 1—Continued

SPAIN: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008	2009[e]
MINERAL FUELS AND RELATED MATERIALS—Continued						
Petroleum:						
Crude	thousand 42-gallon barrels	388	330	334 [r]	298 [r]	250 [4]
Refinery products:						
Liquefied petroleum gas	do.	33,698	33,700 [e]	34,104	34,240	34,200
Naphtha[e]	do.	25,000	25,000	25,300	25,401	25,400
Gasoline, motor	do.	87,593	87,600 [e]	88,651	89,006	89,000
Jet fuel	do.	21,224	21,200 [e]	21,454	21,540	21,500
Kerosene	do.	16,000 [e]	16,000 [e]	16,192	16,257	16,300
Distillate fuel oil	do.	112,000 [e]	112,000 [e]	113,319	113,740	114,000
Residual fuel oil	do.	57,294	57,300 [e]	57,988	58,220	58,200
Other	do.	80,000 [e]	80,000 [e]	80,960	81,284	81,300
Refinery fuel and losses	do.	26,000 [e]	26,000 [e]	26,312	26,417	26,400
Total	do.	459,000 [e]	459,000 [e]	464,280	466,105	466,000

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to total shown. [p]Preliminary. [r]Revised. -- Zero.

[1]Table includes data available through July 2010. Sources: Industria y Minería, 2009. Ministerio de Industria, Turismo y Comercio—Secretaría General de Energía.

[2]Reflects aluminum hydrate.

[3]Reported data. Source: Alcoa Inc. 2009 Annual Report. [The San Ciprián facility is owned 100% by Alúmina Española S.A., which is a subsidiary of Alcoa World Alumina and Chemicals (AWAC) and is co-owned by Alcoa (60%) and by Alumina Ltd. (40%).]

[4]Reported figure.

[5]Reported data. Source: World Metal Statistics, July 31, 2010.

[6]Includes sand obtained as a byproduct of feldspar and kaolin production.

[7]Not elsewhere specified.

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TABLE 2
SPAIN: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Alumina		Aluminio/Alúmina Española S.A. (Alcoa Inc., 60%, and Alumina Ltd., 40%)	Alumina plant at San Ciprian, Lugo	1,500
Aluminum		do.	Electrolytic plant at San Ciprian, Lugo	228
Do.		Alcoa Inespal S.A. (Alcoa Inc., 100%)	Electrolytic plant at Aviles	93
Do.		do.	Electrolytic plant at La Coruña	87
Barite		Minerales y Productos Derivados S.A. (Minersa)	Mine and plant at Vera, Almeria	100
Bentonite		Süd-Cheme España SL	Mine and plant at Yuncos, Toledo	150
Cement		Ashland S.A.	Puerto de Sagunton, Valencia	2,000
Do.		do.	Villaluenga de la Sagra, Toledo	2,000
Do.		do.	3 other plants	2,000
Do.		35 other companies	49 other plants	38,000
Coal:				
Anthracite		Antracitas Gaiztarro S.A.	Mines at Maria and Paulina	2,000
Do.		do.	Mines near Oviedo	2,000
Do.		Antracitas del Bierzo S.A.	Mines near Leon	1,000
Bituminous		Hulleras del Norte S.A. (HUNOSA)	Various mines and plant	3,300
Do.		Hulleras Vasco Leonesa S.A.	Santa Lucia Mine, Leon	2,000
Do.		Minas de Figaredo S.A.	Mines near Oviedo	1,000
Do.		Nacional de Carbon del Sur (Encasur)	Rampa 3 and San Jose Mines, Cordoba	200
Lignite		Empresa Nacional de Electricidad S.A. (Endesa)	As Pontes Mine, and Andorra Mine, La Coroña	15,000
Copper:				
Metal, content		Atlantic Copper S.A. (Freeport MacMoRan Copper & Gold Inc., 100%)	Refinery at Huelva	270
Do.		do.	Electrolytic refinery at Huelva	105
Do.		Industrias Reunidas de Cobre	Smelter at Asua-Bilbao	30
Do.		Elmet SL	Smelter and electrolytic refinery at Berango, Vizcaya	60
Do.		Atlantic Copper S.A. (Freeport MacMoRan Copper & Gold Inc., 100%)	Mines and plant at Arientero near Santiago de Compostela	12
Do.		do.	Alfredo underground mine in Rio Tinto area	30
Do.		Cobre Las Cruces S.A. (Inmet Mining Co., 70%, and Leucadia Mining Co., 30%)	Open pit mines in Seville, Andalucia	210
Do.		do.	Cathode Electrowinning at Las Cruces in Sevile	72
Do.		Minas de Rio Tinto S.A.	Cero Colorado open pit mine	20
Do.		Rio Narcea Gold Mines, Ltd. (Lundin Mining Corp., 100%)	Aguablanca Mine, Extremadura	7
Dunite		Pasek España S.A.	Mines and plant at Landoy, Ortigueira	1,500
Fluorspar, ore		Minerales y Productos Derivados S.A. (Minersa)	Plant at Torre, Asturias	150
Do.		do.	Underground mines at Emilio, Jaimina, and Moscona, Asturias	420
Gold	kilograms	Rio Narcea Gold Mines, Ltd.	El Valle and Carles mines, Asturias	3,750
Lead:				
Metal, content		Española del Zinc S.A.	Refinery at Cartagena, Murcia	50
Do.		Compañia La Cruz, Minas y Fundaciones de Plomo S.A.	Smelter at Lineares, Jaen	40
Do.		do.	Refinery at Lineares, Jaen	40
Do.		Tudor S.A.	Secondary smelter at Saragoza	16
Do		Ferroaleaciones Españolas, S.A.	Secondary smelter at Medina del Campo	12
Do		Derivados de Minerales y Metales	Secondary smelter at Barcelona	5
Do		Sociedad Minera y Metalúrgica de Peñarroya de España S.A. (Peñarroya, France, 90%)	Opencast mine at Montos de Los Azules	25
Do.		Exploración Minera International España S.A. (EXMINESA)	Underground mine at Rubiales, Lugo	16
Magnesite		Magnesitas Navarras S.A.	Mine at Eugui, plant at Zubiri	600
Do.		Magnesitas de Rubián S.A.	Plant at Monte Castel	70
Do.		SA Reverte	Plant at Zaragoza	443

See footnotes at end of table.

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TABLE 2—Continued
SPAIN: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Nickel, metal, content		Rio Narcea Gold Mines, Ltd. (Lundin Mining Corp., 100%)	Aguablanca Mine, Extremadura	8
Petroleum:				
Crude	42-gallon barrels per day	Chevron S.A.	Oilfield at Casablanca	300
Refined	do.	Repsol YPF S.A.	Refinery at Escombreras	200,000
Do.	do.	do.	Refinery at Puertollano	14,000
Do.	do.	do.	Refinery at Tarragona	260,000
Do.	do.	Refineria de Petróleos del Norte S.A. (Petronor)	Refinery at Somorrostro	240,000
Do.	do.	Compañía Española de Petróleos S.A. (Cepsa)	Refinery at Santa Cruz de Tenerife	160,000
Do.	do.	Petroleos del Mediterraneo S.A. (Petromed)	Refinery at Castellón de la Plana	120,000
Do.	do.	Compañía Iberica Refinadora de Petróleos S.A. (Petroliber)	Refinery at La Coruña	140,000
Potash, ore		Iberpotash S.A. (Dead Sea Works Ltd.)	Mines and plants at Suria near Barcelona	850
Pyrite		Compañia Española de Mines de Tharsis	Mines and plants at Tharsis and Zarza (closed)	1,300
Do.		do.	Plant at Huelva	600
Do.		Rio Tinto Minera S.A. (Rio Tinto plc, 75%, and Rio Tinto Zinc, 25%)	Mines and plant at Rio Tinto (closed 2001)	900
Sepiolite		The Tolsa Group	Mine and plant at Vicalvaro near Madrid	100
Do.		Silicatos-Anglo-Ingleses S.A.	Mine and plant at Villecas near Madrid	200
Silver	metric tons	Polar Minin Oy (Dragon Mining NL, 50%, and Ormonde Mining plc, 50%)	Valiña silver project, Lugo Province	4
Sodium sulfate		Crimidesa S.A.	Mine and plant at Cerezo de Rio, Burgos	600
Steel		Aceralia Corporación Siderúrgica (Arbed S.A., 35%)	Plants at Aviles, Gijon, Sagunto, and Sestao	8,000
Do.		Compañia Española de Laminacion S.L. (Celsa), 100%	Plant at Barcelona	2,600
Do.		Sidenor Industrial, S.L. (Gerdau Group, 50%, and Santander Group, 50%)	Plant at Basauri	2,500
Strontium		Solvay Minerales S.A.	Mines and plant at Escuzar, Granada	85
Do.		Bruno S.A.	Mine and plant at Montevives, Granada	50
Uranium, U_3O_8	metric tons	Empresa Nacional del Uranio (Enusa) (Government, 100%)	Mines and plant near Ciudad Real	500
Zinc, metal, content		Asturiana de Zinc S.A. (Azsa) (Xstrata plc, 100%)	Electrolytic zinc plant at San Juan de Nieva Castillon	500
Do.		Española del Zinc S.A.	Electrolytic plant at Cartagena	50
Do.		Asturiana de Zinc S.A. (Xstrata plc, 100%)	Reocin mines and plants (closed 2003)	500
Do.		Exploración Minera International España S.A. (EXMINESA)	Underground mine at Rubiales, Lugo	500
Do.		Sociedad Minera y Metalúrgica de Penarroya-Espana S.A.	Mines and plants at Montos de los Azules y Sierra de Lujar, San Agustin	200

Do., do. Ditto.

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The Mineral Industry of Sweden

By Harold R. Newman

The Fennoscandian Shield, which forms a large part of the Nordic countries, has historically been one of the most active mining areas in Europe. Documented archaeological evidence indicates that copper was produced from the Falun Mine early in the 8th century (Erickson and Qvarfort, 1996).

Sweden continued to be an active mining country in 2009. Natural resources have long formed the basis of the country's economy. Sweden was one of the European Union's (EU's) leading producers of ores and metals, in terms of output. Intensive exploration in recent years resulted in many old prospects being upgraded with new information. This gave an opportunity to reevaluate the prospects and possibly upgrade the potential for development. In 2009, about 100 exploration companies operated in Sweden. Most of them were fairly small, and the major part of exploration investment came from larger, established mining companies. The principal mineral-rich mining centers were the Norrbotten and the Skellefte districts. Three of Sweden's largest mines, in terms of output, are located in the Norrbotten district in northern Sweden (Mining Journal, 2009a).

Companies operating in the mineral resource sector benefited from the country's history of mineral production, available geoscience data, ore potential, extremely low sovereign risk, well-developed infrastructure, and strong mining culture. Also, Sweden has mining laws that were favorable to the mining industry and a low corporate tax rate (Avalon Minerals Ltd., 2009b).

Minerals in the National Economy

Sweden was a leading mineral producer in Europe. It has substantial base-metal, gold, and iron ore deposits, which were actively being exploited and developed. Mining and processed metals production continued to be of significant importance to the country's economy. The output of this sector contributed 0.3% to Sweden's gross domestic product (Mbendi Information Services (Pty) Ltd., 2009).

The Swedish mineral industry was recovering in 2009 following a pause in exploration activity caused by the economic downturn. Companies had cut expenditures in 2008 owing to the difficulty of raising financing. Estimated expenditures in 2009 were $63 million, which was a decrease of about 45% from expenditures in 2008 (Mining Journal, 2009b).

Production

Sweden has a variety of mineral resources and was the leading producer of iron ore in the EU. The country produced ferrous and nonferrous metals, including copper, gold, iron ore, lead, silver, and zinc, and extracted industrial minerals, including crushed stone, dimension stone, and feldspar. Sweden was a major trading country; the amount of mineral commodities produced depended mainly on the external demand for these commodities. Primary aluminum production decreased. Mine production of zinc increased whereas refinery production of ferrochrome decreased (table 1).

Structure of the Mineral Industry

The Swedish mineral industry was composed mostly of privately owned companies and operated on a free-market basis. The Government was the major equity owner of the country's iron ore operations (98%) and had significant ownership in the steel operations (48%). Table 2 is a list of the major mineral industry facilities, their production capacities, and the mineral products they produced in 2009.

Mineral Trade

Trade was important to the national economy. In 2009, U.S. exports to Sweden were valued at $4.6 billion and U.S. imports from Sweden were valued at $8.2 billion. Significant mineral commodity exports to Sweden from the United States included precious metals ($97.7 million), nuclear fuel materials ($93.7 million), metallurgical-grade coal ($67.5 million), nonferrous metals ($30.6 million), and fuel oil ($22.5 million). Significant import commodities from Sweden to the United States included other petroleum products ($329.6 million), semifinished iron and steel mill products ($315.2 million), specialized mining and oil processing equipment ($29.6 million), and fuel oil ($11.6 million) (U.S. Census Bureau, 2009a-c).

Commodity Review

Metals

Copper.—Avalon Minerals Ltd. of Australia acquired the Adak and the Viscaria copper projects from Phelps Dodge Exploration Sweden AB, which was a wholly owned subsidiary of Freeport-McMoran Copper and Gold Inc. of the United States, in 2008. The Adak project contained four historical mines—the Adak, the Brannmyran, the Lindskold, and the Rudtjebacken—and is located in the Skelleftea mining district of northern Sweden. Avalon Resources was interested in Adak because of the exploration potential surrounding the existing mines and at depth, and because of its strategic location within trucking distance of existing concentration facilities. Avalon Resources considered Adak to be a promising brownfields project in an active mining district. A 600-kilometer (km)-line airborne detailed versatile time domain electromagnetic (VTEM) geophysical survey was completed in 2009. The VTEM data were being interpreted by Southern Geosciences Consultants (SGC) of Australia with the aim of generating exploratory resource drilling targets (Avalon Minerals Ltd., 2009a).

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The historic Viscaria Mine is located 4 km from Luossavaara-Kiirunavaara AB's (LKAB) Kiruna Mine in the Norrbotten area of northern Sweden. Avalon acquired the exploration licenses for the Viscaria deposit. Avalon's regional exploration area covered conductive target zones identified from historical airborne electromagnetic (EM) data for 111 square kilometers of prospective ground. SGC was reprocessing the EM data to identify the conductivity features to drill. Avalon's aim was to delineate sufficient resources at Viscaria to sustain a return to copper mining operations by 2012. Avalon announced a phase 1 scenario for Viscaria whereby a 300,000-metric-ton (t) plant would process ore grading 3% copper to produce 36,000 t of copper concentrate grading 25% copper for a copper content of 9,000 t. The capital cost was estimated to be $30 million (Avalon Minerals Ltd., 2009c).

Gold.—Dragon Mining Ltd. of Australia's Svartliden Mine is located 700 km north of Stockholm and west of the Skellefteå Mining District in an area that is developing into a gold-rich province referred to as the "Gold Line." The Svartliden Mine was brought into production in March 2005 and had produced a total of 5,979 kilograms (kg) of gold as of December 31, 2009. Ore was processed through a carbon-in-leach (CIL) processing plant that operated continuously and had a design capacity of 300,000 metric tons per year of gold. Open pit mining was done mainly in the eastern area of the pit as the western area had been mined to final depth. Production in 2010 was expected to be 1,106 kg from 353,000 t of gold ore at a head grade of 3.8 grams per metric ton (g/t) and a recovery rate of 91%. All ore would be mined from the Svartliden open pit (Dragon Mining Ltd., 2009).

An internal study by Dragon Mining confirmed the viability of an underground mine operation at Svartliden. In mid-2009, Dragon Mining was granted permission to develop a 1-km underground decline with a 100,000-t test mining operation. The objective would be to commence the portal and decline in mid-2010 and allow for a seamless transition from open pit mining to underground mining in 2011. In the first half of 2009, Dragon Mining focused on drilling depth extensions to underground mineralization. Highlights of drilling included 14 meters (m) of core grading 8.57 g/t gold, 5 m grading 8.67 g/t gold, and 3 m grading 12.8 g/t gold. Final assay results were pending, following which a resource estimate was planned (Metals Economics Group, 2009b).

Gold-Ore Resources Ltd. announced that it planned to increase the gold output at its Bjorkdal Mine. The increase in throughput at the mine would be achieved by accessing two new underground levels. The mining schedule for the open pit would be increased to two blasts per month in 2009 compared with one blast per month in 2008. Gold-Ore budgeted $3.2 million to finance the mine expansion as well as a plant and tailings facility that would increase recovery, productivity, and mine life (Gold-Ore Resources Ltd., 2009).

Gold-Ore announced results from drilling at the Ronnberget project. Highlights of the drilling included 4 m of core grading 3.9 g/t gold and 4.5 m grading 18.6 g/t gold. The property hosts gold-bearing veins similar to Bjorkdal along with silicified and altered zones with disseminated copper and gold, which suggests a porphyry-style target. Planning for further exploration was underway in 2009 (Metals Economics Group, 2009a).

Gold Rim Resources Ltd. of Australia announced that it had identified strong gold grades at 230 m below surface in the Eastern copper-gold zone at Falun, including intercepts of 10.6 m grading 8.6 g/t gold, 0.5% copper, and 0.2% bismuth. Multiple gold intercepts were obtained along with bismuth and copper that appeared to confirm the presence of semivertical gold shoots linking high-grade gold near the surface with past gold workings at the 350-m level. The mineralization appeared to be related to a number of bornite-chalcopyrite-pyrite sulfide zones. In some of these zones, occurrences of visible gold were noted (Golden Rim Resources Ltd., 2009).

Iron and Steel.—Grängesberg Iron AB announced that the main mineral resources of the Grängesberg Mine were compliant with the National Instrument 43-101 Standard. Estimated measured and indicated resources amounted to 82.8 million metric tons (Mt) with additional estimated inferred resources of 37.5 Mt at a depth between 650 m and 1,000 m. The average iron ore grades were 57% (Exploration Newsletter, 2009).

Molybdenum.—Beowulf Mining plc of the United Kingdom announced that it had been granted a new exploration license for the Munka area. The license area covers 800 hectares and hosts Sweden's largest drill-confirmed deposit of molybdenum. The Munka project is located in the Rappen geologic district of Arjeplog County in northern Sweden. The deposit, which was confirmed by historic drilling, is more than 800 m in length and has parallel mineralized lenses of various widths in excess of 20 m. Based on historical drilling results, the estimated resource for the Munka deposit up to 100 m in depth was 1.7 Mt grading 0.156% molybdenum. At the estimated tonnage, the Munka deposit was the largest molybdenum deposit in Sweden. This historic estimate does not comply with the international standards existing in 2009 (London Stock Exchange Ltd., 2009).

Industrial Minerals

Fluorspar.—Tertiary Minerals plc of the United Kingdom continued drilling and exploration in the Vasterbotten district of northern Sweden to outline the Storuman fluorspar deposit. The basis for the Storuman project was a large area of flat-lying sandstone-hosted fluorspar mineralization that extends across an area of about 2 km by 1.2 km where the mineralized horizon is typically 3-m to 10-m thick across the license area. A resource estimate of tonnage and grade had been made for the deposit; the estimate was in the range of 28 to 31 Mt grading 11.2% to 12.3% calcium fluoride using an 8% cutoff grade. A conventional open pit strip mining operation of 1 million metric tons per year (Mt/yr) was planned and would have an expected mine life of 18 years (Tertiary Minerals plc, 2009).

Mineral Fuels and Related Materials

Natural Gas.—In January 2010, Royal Dutch Shell plc of the Netherlands began a drilling program to exploit shale gas at Sjobo. A total of four wells were planned for 2010 that were expected to satisfy Sweden's natural gas requirements for 10 years. Sweden was one of several countries in Europe where exploration for shale gas was being carried out by international

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natural gas and petroleum companies. The International Energy Agency estimated that unconventional gas resources in Europe, including coalbed methane, could amount to 35 trillion cubic meters, which is six times higher than the continent's conventional gas resources (Watkins, 2009).

The plan by the Germany-Russia consortium Nord Stream AG to build a natural gas pipeline under the Baltic Sea cleared two major hurdles as Finland and Sweden approved the construction of the pipeline project in their respective waters. The pipeline would deliver 55 billion cubic meters per year of natural gas. Delivery would be from Viborg, Russia, to Greifswald, Germany. The EU backed the plan because it means that the EU, while still heavily dependent on Russia for its energy needs, would be less at risk of supply disruptions. Environmentalists have raised concerns that pipeline construction could damage the floor of the Baltic Sea and dredge up hazardous munitions that lie there (Domain-b.com, 2009).

Uranium.—Nuclear power in Sweden received a significant boost when the Government announced plans to lift the nearly 30-year ban on nuclear powerplants as part of a new drive to increase energy security and combat global warming. The country has become increasingly dependent on energy imports from Norway. Sweden's 10 nuclear reactors at three plants (Forsmark, Oskarshamm, and Ringhals) supply about one-half of the country's electricity. Two other reactors at Barsaback had been closed for the past decade. The Government also outlined plans to increase the proportion of renewable energy consumed to 50% of total energy consumption (Macalister, 2009).

Mawson Resources Ltd. of Canada announced plans to drill four uranium prospects at the Hotagen prospect. The company proposed to drill 400 shallow diamond drill holes to test the bedrock for strike extensions of uranium mineralization at known prospects. This was to be a near-surface program where the drill holes would average 5 m in depth. The four project areas to be drill tested were Kläppibäcken, Nöjdfjället, Ravinen, and Urban Hill. Mawson also planned a substantial diamond drilling program to extend the Kläppibäcken resources down to a 250-m vertical depth and along strike, as well as following up anomalies defined from near the surface (Mawson Resources Ltd., 2009).

Outlook

Mining is expected to remain very significant to Sweden's economy. The global role of Sweden as an iron ore producer will increase as production increases. Within 5 to 10 years, iron ore production is expected to reach 50 Mt/yr. Sweden has substantial base-metal, gold, and iron ore deposits, which are expected to continue to be actively exploited and developed. Uranium exploration will likely increase with the lifting of the ban on nuclear power. Foreign companies are likely to continue to explore actively in Sweden for base metals, diamond, and particularly for gold. The Government is expected to continue its efforts to increase the production and use of renewable energy in electricity, heating and cooling, and transport with the goal of 50% use of renewable energy by 2020.

References Cited

Avalon Minerals Ltd., 2009a, Adak project: Avalon Minerals Ltd., 2009. (Accessed April 16, 2009, at http://www.avalonminerals.com.au/Adak_Project.htm.)

Avalon Minerals Ltd., 2009b, Mining in Sweden: Avalon Minerals Ltd. (Accessed April 16, 2009, at http://www.avalonminerals.com.au/Sweden_Overview.htm.)

Avalon Minerals Ltd., 2009c, Viscaria project: Avalon Minerals Ltd. (Accessed April 16, 2009, at http://www.avalonminerals.com.au/Viscaria_PROJECT.HTM.)

Domain-b.com, 2009, Sweden and Finland approve Nord Stream pipeline under Baltic Sea: Alexander's Gas & Oil Connections. (Accessed December 23, 2009, at http://www.gasandoil.com/goc/news/nte95012.htm.)

Dragon Mining Ltd., 2009, Svartliden gold mine: Dragon Mining Ltd. (Accessed January 7, 2011, at http://www.dragon-mining.com.au/-Svartliden-Sweden-.html.)

Erickson, J.A., and Qvarfort, U., 1996, Age determination of the Falun Coppermine by ^{14}C-datings and palynology: GFF, v. 118, p. 43-47.

Exploration Newsletter, 2009, What's up in Sweden: Exploration Newsletter, November, p. 1.

Gold-Ore Resources Ltd., 2009, Gold-Ore announces expansion plans at Bjorkdal gold mine: Gold-Ore Resources Ltd. (Accessed April 5, 2010, at http://www.goldoreresources.com/s/NewsReleases.asp?ReportID=337032&_Type=News-Releases&_title=gok-ore-announces-expansion-plans--Bjorkdal-gold-mine.)

Golden Rim Resources Ltd., 2009, High grade gold assays from deep drilling at Falun: Golden Rim Resources Ltd., p. 1. (Accessed January 14, 2009, at http://www.metalseconomics.com/pdfpath/1007993278.pdf.)

London Stock Exchange Ltd., 2009, Exploration license granted in respect of the largest molybdenum deposit in Sweden: London Stock Exchange Ltd. (Accessed November 27, 2009, at http://www.londonstockexchange.com/exchange/prices-and-news/news/market-news-detail.htm?announcementid=10286.)

Macalister, Terry, 2009, Sweden lifts ban on nuclear power: The Guardian [London, United Kingdom]. (Accessed February 5, 2009, at http://www.guardian.co.uk/environment/2009/feb/05/sweden-nuclear-power/print.)

Mawson Resources Ltd., 2009, Mawson plans to drill at 4 uranium prospects at Hotagen: Mawson Resources Ltd., p. 1. (Accessed September 1, 2009, at http://www.metalseconomics.com/pdfpath/1007943892.pdf.)

Mbendi Information Services (Pty) Ltd., 2009, Mining in Sweden—Overview: Mbendi Information Services (Pty) Ltd. (Accessed January 7, 2011, at http://www.mbendi.com/indy/ming/eu/ss/p0005.htm.)

Metals Economics Group, 2009a, Ronnberget: Metals Economics Group. (Accessed September 17, 2009, at http://www.services.metalseconomics.com/Minesearch/Default.aspx?profile&projAid=92094.)

Metals Economics Group, 2009b, Svartliden: Metals Economics Group. (Accessed September 17, 2009, at http://services.metalseconomics.com/Minesearch/Default.aspx?profile&projAid=96445.)

Mining Journal, 2009a, Sweden—A supplement to Mining Journal: Mining Journal, February, 11 p.

Mining Journal, 2009b, Sweden ends 2009 on a high: Mining Journal, November 20, p. 30.

Tertiary Minerals plc, 2009, Storuman: Tertiary Minerals plc. (Accessed January 4, 2011, at http://www.tertiaryminerals.com/storuman.html.)

U.S. Census Bureau, 2009a, Product data: U.S. Census Bureau. (Accessed January 4, 2011, at http://www.census.gov/foreign-trade/statistics/product/enduse/exports/c4010.html.)

U.S. Census Bureau, 2009b, Product data: U.S. Census Bureau. (Accessed January 4, 2011, at http://www.census.gov/foreign-trade/statistics/product/enduse/imports/c4010.html.)

U.S. Census Bureau, 2009c, Trade with Sweden: U.S. Census Bureau. Accessed January 23, 2010, at http://www.census.gov/foreign-trade/balance/c4010.html.)

Watkins, Eric, 2009, Shell begins drilling for shale gas in Sweden: Oil & Gas Journal. (Accessed January 15, 2010, at http://www.ogj.com/ogj/en-us/index/article-tools-template-articles.oil-gas-journal.drilling-production-2.drilling-operations.2010.01.shell-begins_drilling.html.)

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TABLE I

SWEDEN: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008	2009[e]
METALS						
Aluminum, metal:						
Primary		102,567 [r]	101,180	98,014	81,546	78,000
Secondary[e]		30,000	32,000	32,000	32,000	30,000
Total		132,567 [r]	133,180	130,014	113,546	108,000
Copper:						
Mine output, Cu content		87,068 [r]	86,746	62,905	57,688	46,019 [2]
Metal:						
Smelter:						
Primary		192,000 [e]	194,200	203,107	204,204	200,000
Secondary		55,000 [e]	64,243	55,148	67,795	65,000
Total		247,000 [e]	258,443	258,255	271,999	265,000
Refined:						
Primary		223,482	229,241	213,894	227,774	225,000
Secondary[e]		22,000	25,000	25,000	25,000	25,000
Total		245,482	254,241	238,894	252,774	250,000
Gold:						
Mine output, Au content	kilograms	6,564 [r]	6,848	5,159	5,530	5,600
Metal, primary[e, 3]	do.	8,000	8,000	8,000	8,000	8,000
Iron and steel, metal:						
Iron ore concentrate and pellets:[e]						
Gross weight	thousand metric tons	23,300	23,300	24,700	23,800	17,700
Fe content	do.	15,300 [r]	15,300 [r]	16,100 [r]	15,400 [r]	11,300
Metal:						
Pig iron and sponge iron	do.	3,730	3,577	3,815	3,583	3,800
Ferroalloys:						
Ferrochromium		127,451	136,374	124,403	117,053	31,345 [2]
Ferrosilicon[e]		9,800	4,000	4,000	4,000	3,500
Total		137,251	140,374	128,403	121,053	34,845 [2]
Steel, crude	thousand metric tons	5,692	5,435	5,673	5,196	2,805 [2]
Semimanufactures[e]	do.	4,700 [r]	4,500 [r]	4,600 [r]	4,200 [r]	4,000
Lead:						
Mine output, Pb content		60,445	55,644	63,224	65,100 [e]	65,000
Metal, refined:[e]						
Primary		32,800	70,100	69,700	56,800	55,000
Secondary		46,100 [2]	43,900	40,000	42,600	42,000
Total		78,900 [2]	114,000 [2]	139,700 [r, 2]	99,400	97,000
Molybdenum, oxide, roasted, Mo content[e]		3,000	3,000	3,000	3,000	2,800
Nickel, metal, secondary[e]		50	50	50	50	50
Selenium, elemental, refined[e]		20	20	20	20	20
Silver:						
Mine output, Ag content	kilograms	309,933	292,255	323,171	293,100	290,000
Metal, primary[e, 3]	do.	250,000	225,000	225,000	250,000	225,000
Zinc, mine output, Zn content		215,691	210,029	214,576	188,048 [r]	192,538 [2]
INDUSTRIAL MINERALS						
Cement, hydraulic[e]	thousand metric tons	2,600	2,600 [2]	2,500 [2]	2,500	2,600
Diamond, synthetic[e]	thousand carats	20,000	20,000	20,000	20,000	20,000
Feldspar, salable, crude and ground[e]		43,000	43,000	42,000	42,000	44,000
Fertilizer, manufactured:[e]						
Nitrogenous	thousand metric tons	400	400	400	400	400
Phosphatic	do.	10	10	10	10	10
Mixed	do.	300	300	300	300	300
Graphite[e]		800	800	800	800	800
Lime[e]	thousand metric tons	600	600	600	600	600
Quartz and quartzite[e]	do.	700	700	700	700	700

See footnotes at end of table.

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TABLE 1—Continued

SWEDEN: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008	2009[e]
INDUSTRIAL MINERALS—Continued						
Stone:[e]						
Dimension:						
Mostly unfinished	thousand metric tons	170	170	170	170	170
Granite	do.	132	132	132	132	132
Limestone	do.	32	32	32	32	32
Slate	do.	16	16	16	16	16
Other	do.	6	6	6	6	6
Crushed:						
Dolomite	do.	450	450	450	450	450
Granite	do.	3,500	3,500	3,500	3,500	3,500
Limestone:						
Chalk	do.	80	80	80	80	80
For cement manufacture	do.	4,000	4,000	4,000	4,000	4,000
For lime manufacture	do.	950	950	950	950	950
For other construction and industrial uses	do.	1,800	1,800	1,800	1,800	1,800
For agricultural uses	do.	650	650	650	650	650
For other uses	do.	1,500	1,500	1,500	1,500	1,500
Total	do.	8,980	8,980	8,980	8,980	8,980
Sandstone	do.	20	20	20	20	20
Undifferentiated	do.	30,000	30,000	30,000	30,000	30,000
Other	do.	350	350	350	350	350
Sulfur:[e]						
Metallurgy	do.	240	240	240	240	240
Petroleum	do.	60	60	60	60	60
Total	do.	300	300	300	300	300
Talc, soapstone[e]		14,000	14,000	14,000	14,000	15,000
MINERAL FUELS AND RELATED MATERIALS						
Coke, metallurgical[e]	thousand metric tons	1,400	1,400	1,400	1,400	1,400
Gas, manufactured:[e]						
Coke oven gas	million cubic meters	500	500	500	500	500
Blast furnace gas	do.	3,500	3,500	3,500	3,500	3,500
Peat:						
Agricultural use[e]	thousand cubic meters	1,200	1,716 [2]	1,700	1,280	1,400
Fuel	do.	1,900	3,041 [2]	3,000	1,500	1,500
Petroleum, refinery products:[e]						
Liquefied petroleum gas	thousand 42-gallon barrels	5,022 [2]	5,000	5,000	5,000	5,000
Naphtha	do.	500	500	500	500	500
Gasoline, motor	do.	34,164 [2]	35,000	35,000	35,000	35,000
Jet fuel	do.	606 [2]	600	600	600	600
Kerosene	do.	10	--	--	--	--
Distillate fuel oil	do.	53,509 [2]	54,000	54,000	54,000	54,000
Residual fuel oil	do.	35,785 [2]	36,000	36,000	36,000	36,000
Other	do.	20,761 [2]	21,000	21,000	21,000	21,000
Refinery fuel and losses	do.	10,147 [2]	10,000	10,000	10,000	10,000
Total	do.	160,504 [r,2]	162,000	162,000	162,000	162,000

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. do. Ditto. -- Zero.

[1]Table includes data available through January 31, 2010.

[2]Reported figure.

[3]Includes only that recovered from indigenous ores, excluding scrap.

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TABLE 2
SWEDEN: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum		Kubikenborg Aluminium AB (Kubal AG, 100%)	Sundsvall smelter at Kubikenborg	100
Cement		Cementa AB (HiedelbergCement AG, 100%)	Plants at Degerhamn, Skovde, and Slite	3,400
Copper:				
Ore, copper content		Boliden Mineral AB	Mines at Aitik, Garpenberg, Kankberg, Kristineberg, Langdal, Mourliden, Mourliden Ostra, Petiknas, and Renstrom	68
Metal		Boliden Metals AB	Smelter and refinery at Ronnskar	240
Feldspar		Berglings Malm & Mineral AB (Omya GmbH)	Mines at Beckegruvan, Hojderna, and Limbergsbo	50
Do.		Silbelco Nordic AS	Mines at Forshammar	30
Do.		Larsbo Kalk AB (Omya GmbH)	Manufactured from marble at Storia	20
Ferroalloys		Vargon Alloys AB	Plant at Vargon	175
Gold:				
Ore, gold content	kilograms	Gold-Ore Resources Ltd.	Bjorkdal Mine at Skellefte	1,135
Do.	do.	Boliden Mineral AB	Mines at Aitik, Akerberg, Kankberg, Kristineberg, Langdal, Petiknas, and Renstrom	2,000
Metal	do.	do.	Smelter and refinery at Ronnskar	17,000
Graphite		Woxna Graphite AB (Tricorona Mineral AB, 100%)	Mine and plant at Kringeltjarn, Woxna	20
Iron and steel		Svenskt Stal AB (Government, 48%)	Steelworks at Borlange, Lulea, and Oxelosund	3,900
Iron ore		Luossavaara-Kiirunavaara AB (Government, 98%)	Mines at Kiruna and Malmberget	32,500
Kyanite		Svenska Kyanite AB (Svenska Mineral AB, 100%)	Quarry at Halskoberg	10
Lead:				
Ore, lead content		Boliden Mineral AB	Mines at Garpenberg, and Renstrom	100
Do.		North Mining Svenska AB	Zinkgruvan Mine at Ammeberg	20
Metal		Boliden Metals AB	Smelter and refinery at Ronnskar	115
Do.		Boliden Bergsoe AB	Smelter and refinery at Landskrona	50
Lime		Nordkalk AB	Plant at Storugns	3,200
Do.		Svenska Mineral AB	Plants at Rattvik and Boda	250
Limestone		Kalproduction Storugns AB (Nordkalk AB, 100%)	Mines at Gotland Island	3,000
Marble	cubic meters	Borghamnsten AB	Quarry at Askersund	15,000
Petroleum, refined	42-gallon barrels per day	Preem AB (Corral Petroleum Holdings AB, 100%)	Refinery at Lysekil	210,000
Do.		Shell Raffinaderi AB	do.	82,000
Do.		AB Nynas Petroleum	Refineries at Gothenburg and Nynashamn	50,000
Silver, metal	kilograms	Boliden Metals AB	Smelter and refinery at Ronnskar	408,000
Do.	do.	Lunden Mining Corp.	Zinkgruvan Mine at Ammeberg	25,000
Zinc, ore, zinc content		Boliden Mineral AB	Mines at Garpenberg, Laisvall, Langdal, and Renstrom	112
Do.		Lunden Mining Corp.	Zinkgruvan Mine at Ammeberg	78

Do., do. Ditto.

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THE MINERAL INDUSTRY OF SWITZERLAND

By Harold R. Newman

Switzerland's mineral resources were limited. Mining, exclusive of industrial minerals for construction, played a minor role in Switzerland's economy. No metal mining took place in 2009 owing to the depletion of metalliferous ores in the past. Metal processing, which was restricted to primary and secondary aluminum, secondary lead, and steel, depended on imported raw materials or scrap. Industrial minerals produced by mining and processing included cement, gypsum, and lime, which were used domestically. The saline plants at Bex, Riburg, and Schweizerhalle produced salt for domestic consumption and export.

Switzerland was a member of the European Free Trade Association, and trade has been the key to prosperity in Switzerland. As the world's 18th ranked exporter, Switzerland shipped $207 billion worth of exports in 2009. Principal exports in 2009 were agricultural products, chemicals, machinery, metals, and watches. The principal recipients were Germany, (19.7%), the United States (9.6%), Italy (8.7%), France (8.6%), and the United Kingdom (5.2%). Switzerland imported $192 billion worth of foreign goods in 2009. Major imports included agricultural products, chemicals, fuels, machinery, metals, and vehicles. The principal suppliers were Germany (33.3%), Italy (11%), France (9.4%), the United States (5.8%), and the Netherlands (4.5%). The Swiss economy shrank by an estimated 1.5% in 2009 as a result of the global economic downturn (U.S. Central Intelligence Agency, 2010).

Production

Data on mineral production are in table 1.

Structure of the Mineral Industry

The Swiss mineral industry was owned privately or by regional governments (Cantons). Regulatory control was administered by the national Government. The 26 regional Cantons granted mining and processing licenses and directly operated electricity generating facilities, gas utilities, and water resource facilities. The final authority for the mineral industry was vested in the Federal Council. Table 2 is a list of major mineral industry facilities with their locations and capacities.

Commodity Review

Metals

Aluminum.—Novelis Inc. of the United States was a global leader in aluminum rolled products in terms of production and technology. Novelis continued using its Novelis Fusion™ technology at its 130,000-metric-ton-per-year (t/yr) facility in Sierre. Novelis rolled sheets for the automotive, building, industrial, and transport markets. The site had cold- and hot-rolling and heat-treatment capabilities. The automotive market was a particular specialty (Novelis Inc., 2009b). The company announced that it had recycled an estimated 39 billion aluminum beverage cans, which was a company record. By recycling the used containers back into aluminum sheet, Novelis estimated that it reduced its need for primary aluminum by more than 530,000 t/yr, saving about 73 million British thermal units of energy, and avoiding the production of about 5 million metric tons (Mt) of greenhouse gases. Used beverage cans accounted for about one-half of all aluminum scrap processed by Novelis each year (Novelis Inc., 2009a).

Copper.—Schmelzmetall AG was, in terms of production, a leading manufacturer of copper-based high-performance alloys in the European Union (EU). Schmelzmetall HOVADUR® manufactured the alloys from raw material to finished product. The materials were smelted and cast in inductively heated vacuum furnaces. The proprietary process produces alloys with a high grade of purity. These technologically advanced alloys are heat treated to achieve required properties of hardness and thermal and electrical conductivity (Schmelzmetall AG, 2009).

Gold.—Although Switzerland is not a gold miner, it is home to several refineries. They include Argor-Heraus S.A at Mendrisio, Produits Artistiques de Métaux Précieux S.A. at Castel San Pietro, and Valcambi S.A. at Balerna.

The gold, investment, and securities bankers in Switzerland reported that they were running out of suitable storage space for their customers' gold. The Zurich Cantonal Bank reported that the Gold Index Fund, where physical gold was deposited, was so successful that the bank ran out of storage space. The Swiss National Bank operated other gold storage facilities but would not state where the gold was stored except that it was in different locations in Germany and abroad (deCarbonnel, 2009).

Iron and Steel.—About 1 million metric tons per year (Mt/yr) of scrap steel was collected through a network of collection points, scrap processors, and traders. Stahl Gerlafingen AG was a major consumer of steel scrap and operated a modern high-efficiency electric arc furnace for melting the scrap at its plant at Gerlafingen. Gerlafingen was the leading supplier of reinforced steel products in Switzerland (Stahl Gerlafingen AG, 2009).

Lead.—Metallum Group (Switzerland) AG was located in Pratteln 70 kilometers (km) west of Zurich. Collected scrap metal was processed in shredding and sorting plants. The material was run through shears and presses and a nonferrous high-frequency separator. A flotation plant was used to separate the light and heavy materials. Metallum was active in the international trade of primary and secondary metals and their residues [Metallum Group (Switzerland) AG, 2009].

Industrial Minerals

Cement.—Holcim (Schweiz) AG was the leading cement, concrete, and gravel producer in Switzerland. Holcim operated seven cement plants and grinding stations, and had a production

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capacity of 4.3 Mt/yr. Holcim reported that whereas cement and ready-mix sales remained about the same as in 2008, the building materials market remained under pressure owing to decreased demand (Holcim Ltd., 2009).

Diamond.—Switzerland was involved in the cutting and polishing of diamond and played a large role in international diamond trade activities. The country was a member of the Kimberley Process Certification Scheme.

Mineral Fuels

Natural Gas.—Switzerland did not produce natural gas in 2009. Imported natural gas met 12% of Switzerland's energy requirements. Most of the imported gas was secured in the form of long-term supply agreements with its EU partners (France, Germany, Italy, and the Netherlands). These countries, with the exception of the Netherlands, imported most of their gas from Algeria, Norway, and Russia. Swissgas AG imported three-quarters of the gas used in Switzerland. Although Switzerland uses some Russian gas for its domestic needs, there were no direct contracts with OAO Gazprom of Russia and Swissgas anticipated no restrictions to supply as a result of the Russia/Ukraine pricing dispute. Swiss natural gas consumption was low with respect to total consumption by other countries in the EU (Swissinfo, 2009).

Petroleum.—Celtique Energie Ltd.'s 803-square-kilometer (km^2) permit is located in northwestern Switzerland in the Jura region. The permit contained the very large Cygne Blanc structural prospect, which had a mapped area of about 1,700 hectares The reservoir objective was the Triassic Bunter Sands, which are thick and porous in nearby wells. An effective top seal was provided by thick overlying lenses of Triassic anhydrites and salts. Recoverable reserves of 343 million barrels had been estimated in 2009. Celtique's other prospect, the 802-km^2 Vallorbe license, was located immediately to the southwest of the Neuchatel permit. The numerous natural gas and petroleum seeps in the area could indicate an active hydrocarbon area (Celtique Energie Ltd., 2009).

Tamoil (Suisse) S.A.'s Collombey refinery, which was one of two petroleum refineries in Switzerland, is located about 100 km from Geneva. Production was about 2.7 Mt/yr of petroleum products from crude petroleum brought to Collombey from the Port of Genoa, Italy, through a 340-km-long pipeline. Products produced by the refinery included diesel, gasoline unleaded 98, gasoline unleaded 95, heating oil light and heavy, kerosene, and liquefied petroleum gas; in addition, the refinery supplied about 22 megawatts per year of electricity to the electric power grid. Refinery production represented about 19% of Swiss consumption of petroleum products [Tamoil (Suisse) S.A., 2009].

Petroplus Refining Cressier S.A.'s Cressier refinery (the other petroleum refinery in Switzerland) was an integrated atmosphere-vacuum distillation visbreaking and thermal cracking refinery with a nameplate capacity of 68,000 barrels per day. Cressier's crude petroleum supply arrived by way of a direct pipeline from the marine shipping terminal at Fos-sur-Mer, France. The refinery's diesel and gasoline production meets the EU's mandatory 10 parts per million (ppm) sulfur limit. Cressier's production of light and middle distillates, such as blended diesel, diesel, gasoline, and jet fuel, were sold mostly in Switzerland. Cressier also produced EcoClean, which is a grade of heating oil with less than 50 ppm sulfur (Petroplus Holdings AG, 2009).

Outlook

The outlook for Switzerland's mineral industry is for little change. Metal mining is not likely to be initiated. Industrial minerals will be produced according to local demand. Limited exploration for natural gas and petroleum is expected to continue.

References Cited

Celtique Energie Ltd., 2009, Operations in Switzerland: Celtique Energie Ltd. (Accessed July 25, 2010, at http://www.celtiqueenergie.com/operations/switzerland/index.html.).

deCarbonnel, Eric, 2009, Rush to buy gold fills Swiss bank vaults: Market Skeptics, July 19. (Accessed August 28, 2010, at http://www.marketskeptics.com/2009/07/rush-to-buy-gold-fills-swiss-bank.html.)

Holcim Ltd., 2009, Annual report 2009: Holcim Ltd., 206 p. (Accessed July 25, 2010, at http://www.holcimweb/gc/CORP/uploads/AR_2009.pdf.)

Metallum Group (Switzerland) AG, 2009, Recycling—Recovery of secondary raw materials: Metallum Group (Switzerland) AG. (Accessed July 25, 2010, at http://www.metallumgroup.com/en/recycling.html.)

Novelis Inc., 2009a, Novelis takes aluminum can recycling to new heights: Novelis Inc. (Accessed July 24, 2010, at http://www.novelisrecycling.co.uk/news/2009/95/.)

Novelis Inc., 2009b, Sierre, Switzerland: Novelis Inc. (Accessed July 24, 2010, via http://www.novelis.com/Internet/en-US/AboutUs/Locations.htm.)

Petroplus Holdings AG, 2009, The Cressier refinery: Petroplus Holdings AG. (Accessed July 25, 2010, at http://www.petroplusholdings.com/bus_ref_cre.php.)

Schmelzmetall AG, 2009, Leading manufacturer of copper-based high-performance materials: Schmelzmetall AG. (Accessed July 24, 2010, at http://kunststoff-schweiz.ch/htm/schmelzmatall_ag_englisch.html.)

Stahl Gerlafingen AG, 2009, From the scrap iron to the steel: Stahl Gerlafingen AG. (Accessed July 25, 2010, at http://www.stahl-gerlafingen.com/en/ourbusiness/fromscraptosteel/tabid/911/language/en.US/default.aspx.)

Swissinfo, 2009, Switzerland insulated from Russian gas dispute: Swissinfo, January 7. (Accessed July 25, 2010, at http://www.swissinfo.ch/eng/politics/foreign_affairs/Switzerland_insulated_from_Russia_gas-dispute_html?cid=979446.)

Tamoil (Suisse) AG, 2009, Raffinerie [Refinery]: Tamoil (Suisse) AG. (Accessed July 25, 2010, at http://www.tamoil.ch/FR/Activite/Raffinerie/.)

U.S. Central Intelligence Agency, 2010, Switzerland, *in* The world factbook: U.S. Central Intelligence Agency. (Accessed July 24, 2010, at https://www.cia.gov/library/publications/the-world-factbook/geos/sz.html.)

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TABLE I

SWITZERLAND: ESTIMATED PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Thousand metric tons unless otherwise specified)

Commodity[3]		2005	2006	2007	2008	2009
METALS						
Aluminum:						
Primary	metric tons	44,458	40,000	25,000	--	--
Secondary	do.	193 [4]	190	175 [r]	50	25
Iron and steel, metal:						
Crude steel		1,158 [4]	1,252 [r, 4]	1,264 [4]	1,257 [4]	984 [4]
Semimanufactures		700	700	700	700	600
Lead, refined, secondary	metric tons	8,000	9,000	9,000	8,000	5,000
INDUSTRIAL MINERALS						
Cement, hydraulic		4,022 [4]	4,000	4,000	4,000	4,000
Gypsum		300	300	300	300	300
Lime		85 [r]	90 [r]	90 [r]	90 [r]	80
Nitrogen, N content of ammonia		30	30	30	30	30
Salt		566 [4]	560	560	535	435 [4]
Sulfur, from petroleum refining	metric tons	3,000	3,000	3,000	3,000	3,000
MINERAL FUELS AND RELATED MATERIALS						
Petroleum refinery products:						
Liquefied petroleum gas	thousand 42-gallon barrels	2,285 [r, 4]	2,500 [r]	2,343 [r, 4]	2,500	2,500
Gasoline	do.	10,695 [r, 4]	10,000	10,880 [r, 4]	10,000	10,000
Distillate fuel oil	do.	16,180 [r, 4]	18,000 [r]	16,203 [r, 4]	16,000 [r]	16,000
Residual fuel oil	do.	20,000 [r]	10,000 [r]	3,909 [r, 4]	4,000	4,000
Bitumen	do.	800	800	800	800	800
Refinery fuel and losses	do.	2,321 [r, 4]	2,600 [r]	2,500 [r]	2,500	2,500
Total[5]	do.	52,281 [r, 4]	43,900 [r]	37,000 [r]	35,800	35,800

[r]Revised. do. Ditto. -- Zero.

[1]Estimated data are rounded to no more than three significant digits; may not add to totals shown.

[2]Table includes data available through June 30, 2010.

[3]In addition to the commodities listed, a variety of crude construction materials (common clay, sand and gravel, and stone) were produced, but available information was inadequate to make estimates of output.

[4]Reported figure.

[5]Total of listed products only.

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TABLE 2
SWITZERLAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum		Novelis Inc. (Hindalco Industries Ltd., 100%)	Plant at Sierre	130
Cement		Holcim (Schweiz) AG (Holcim Group, 100%)	Plants (3) at various locations	3,500
Copper, alloy	metric tons	Schmelzmetall AG	Refinery at Gurtnellen	2,400
Gold	kilograms	Produits Artistiques de Métaux Précieux S.A. (MKS Finance SA, 100%)	Refinery at Castel San Pietro	425,000
Do.	do.	Argor-Heraeus S.A.	Refinery at Mendrisio	NA
Do.	do.	Valcambi S.A.	Refinery at Balerna	NA
Lead, secondary		Metallum Group	Smelter at Pratteln	32
Petroleum, refinery	barrels per day	Tamoil (Suisse) S.A. (Colony Capital LLC, 65%, and Government of Libya, 35%)	Refinery at Collombey	72,000
Do.	do.	Petroplus Refining Cressier S.A. (Petroplus Holdings AG)	Refinery at Cressier	68,000
Salt		United Swiss Salt Works (25 Cantons, except Vaud, 100%)	Saline plants at Riburg and Schweizerhalle	500
Do.		Saline de Bex S.A. (Canton of Vaud, 100%)	Saline plant at Bex	50
Steel		Stahl Gerlafingen AG (Schmolz and Bickenbach AG 100%)	Plant at Gerlafingen	650
Do.		von Moss Stahl AG (Schmolz and Bickenbach AG, 100%)	Plant at Emmenbrucke	300

Do., do. Ditto. NA Not available.

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The Mineral Industry of Tajikistan

By Richard M. Levine

Before the dissolution of the Soviet Union, Tajikistan's mineral industry had been mining mineral ores and producing such mineral commodities as aluminum, antimony, arsenic, boron, celestite, cement, coal, construction materials, fluorspar, gold, gypsum, lead and zinc, mercury, molybdenum, natural gas, petroleum, salt, silver, semiprecious and decorative stones, strontium, tin, tungsten, and uranium. Production of some of these mineral commodities had been greatly reduced or had ceased since the dissolution of the Soviet Union in 1991. In 2009, the Tajikistan Aluminum Co. (TALCO) aluminum smelter [formerly the Tajikistan Aluminum Smelter (TadAZ)] was the country's only large-scale production enterprise in the mineral sector.

Tajikistan reportedly has reserves in commercial concentrations of such rare metals as gallium, germanium, indium, tellurium, thallium, and selenium (Orifov, 2001). The Zavershan region of Tajikistan reportedly hosts a number of other rare metals, including lanthanum, lithium, niobium, ytterbium, yttrium, and zirconium, although further exploration would be needed to define the grade and the size of these mineral occurrences (Ibrozhim and others, 2009).

Tajikistan was the world's third ranked producer of hydroelectric power after the United States and Russia. Hydroelectric power accounted for more than 75% of the country's total energy output. Nonetheless, the country's energy consumption per capita was among the lowest in the Commonwealth of Independent States (CIS). Tajikistan depended on electricity supplies from Turkmenistan, which were transmitted through Uzbekistan (Najibullah, 2007, 2008). Tajikistan has additional large untapped hydroelectric generation potential, estimated to be 500 billion kilowatthours per year, which would rank Tajikistan eighth in the world in hydroelectric potential. To date, however, Tajikistan was using only 6% to 7% of its hydroelectric power resources (Khasanov, 2009).

Minerals in the National Economy

In 2009, Tajikistan's foreign trade decreased in value by 23.6% to about $3.579 billion. Exports totaled $1.01 billion, which was a decrease of 28.3% compared with exports in 2008 and reflected the decrease in aluminum exports, which were the country's main export commodity. In 2009, Tajikistan's aluminum exports fell by 41.9% to $604.1 million. In 2009, imports decreased to $2.569 billion as alumina imports fell by 23.2% to $290.1 million (Interfax Russia & CIS Statistics Weekly, 2010).

Production

In 2009, Tajikistan's gross domestic product (GDP) in current prices increased by 3.4% compared with that of 2008. Tajikistan's industrial output in constant prices decreased by 6.3%. Industrial production accounted for 40.8% of the country's GDP compared with 45.6% in 2008. Industrial production decreased owing to a drop in aluminum output. In 2009, gold production in Tajikistan decreased by 18.6% compared with that of 2008 to 1.361 metric tons (t). Fuel and energy output fell by 2.3% in 2009. Tajikistan generated 16.1 billion kilowatthours of electricity, which was 0.3% less than in 2008. The country produced 142,100 t of bituminous coal, which was a 14.4% decrease compared with that of 2008, but 34,500 t of lignite, which was an increase of 5.2%. Oil production increased by 1.2% to 26,100 t, and natural gas production increased by 35.4% to 21.8 million cubic meters. The output of nonferrous metals decreased in value by 7.7% compared with that of 2008, and chemicals and petrochemicals output decreased by 52.7%. Building materials output, however, increased in value by 2.1% (Interfax Russia & CIS Statistics Weekly, 2010).

Structure of the Mineral Industry

Besides the TALCO aluminum smelter, only a few metal mining enterprises were still operating. These included the Anzob mining and beneficiation complex, which mined reserves of the Dzhidzhikrutskoye antimony-mercury deposit, and the Adrasman mining and beneficiation complex, which developed copper-bismuth and lead-silver ores. The main output of the Adrasman complex included concentrate with a lead content of 43% and a silver content of 5.943 grams per metric ton. The country also had enterprises engaged in gold mining and the extraction of coal, natural gas, and oil. Table 2 is a list of major mineral industry facilities.

Commodity Review

Metals

Aluminum.—The Government-owned TALCO aluminum smelter in Tursunzade had a design capacity to produce 517,000 metric tons per year (t/yr) of aluminum. It was 100% dependent on imported alumina. TALCO consumed nearly 40% of the country's total power output, employed 12,000 workers, and indirectly supported a community of 100,000 (Interfax Russia & CIS Metals and Mining Weekly, 2007). Almost all aluminum production was exported. An estimated 5,000 t/yr of aluminum was consumed domestically to produce kitchenware and other household necessities (Embassy of Tajikistan to Pakistan, 2010).

In 2009, TALCO reduced primary aluminum production by about 10% to 359,385 t, which was 4.7% below the amount targeted for the year. TALCO had reduced aluminum production by 4.7% in 2008 to 399,450 t (Interfax Russia & CIS Metals and Mining Weekly, 2010a).

Gold.—In 2009, gold production in Tajikistan decreased by 18.6%. The production decrease was attributed to work

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interruptions caused by modernization of equipment at the Chinese-Tajikistan joint venture at Zerafshan Gold Co. The joint venture was 75%-owned by Zijin Mining Group, which held the license to the Zerafshan gold deposit, which was the country's largest gold deposit. The joint venture planned to increase gold production to at least 1.5 t/yr by 2010 and to increase production to 5 t/yr by 2012. The National Bank of Tajikistan bought all gold mined in the Republic for its gold reserve (Interfax Russia & CIS Metals and Mining Weekly, 2010b).

Mineral Fuels and Related Materials

Uranium.—The Vostokredmet plant in Chkalovsk, which was known as the Leninabad mining and chemical complex until 1992, was established in 1945 to mine and process uranium from deposits in Kyrgyzstan, Tajikistan, and Uzbekistan. During the Soviet era, Vostokredmet produced yellowcake for the Soviet nuclear power and defense industries and processed up to 1 million metric ton per year of uranium ore. In the Soviet era, the city of Chkalovsk had been one of centers of the uranium processing industry, and Tajikistan was concerned about the safety of a large number of leftover uranium tailings dumps. Radioactive waste was stored in tailings dumps that did not meet appropriate safety rules and were situated in immediate proximity to residential areas and rivers and would require a large amount of funds to remediate (WISE Uranium Project, 2009).

In an address to the Parliament of Tajikistan in April 2008, the President of Tajikistan stated that Tajikistan had 14% of the world's uranium reserves. Subsequently, that year the Parliament of Tajikistan allowed foreign companies to extract uranium ore in the country (Mukherjee, 2009).

Foreign countries were interested in participating in developing Tajikistan's uranium resources. Russia was considering helping Tajikistan develop its uranium deposits, and proposed to assist with geologic prospecting in Tajikistan with the aim of subsequent extraction and possible processing of uranium (WISE Uranium Project, 2008). China's Guangdong Corp. expressed an interest in projects to develop uranium deposits in Tajikistan as well (New Europe, 2008). Also, following the President of India's visit to Russia and Tajikistan in September 2009, the Government of Tajikistan agreed to allow Indian companies to explore uranium deposits in that country, with the Indians reportedly being given access to explore known uranium deposits. The Uranium Corporation of India Ltd. had been involved in uranium extraction in India for decades already, and the company reportedly had the requisite technological capability to operate uranium mines (Upadhya, 2009).

Outlook

Tajikistan has significant mineral resources awaiting development, including a large number of rare metals, rare-earth elements, and uranium, which could be of interest for future development. The country still suffered from a lack of infrastructure and at times severe energy shortages, which were impediments to mineral development. The development of needed infrastructure and hydroelectric power sources would be an important factor in future mineral development. Developing hydroelectric energy was considered key for future economic growth because of the country's need to import oil and natural gas from neighboring countries and the high energy consumption of the country's aluminum smelter. Tajikistan imported a significant portion of its hydrocarbon fuel requirements from Uzbekistan. Other CIS countries, such as Kazakhstan and Turkmenistan, provided much of the remainder of the country's imported hydrocarbons (Embassy of Tajikistan to Pakistan, 2010).

References Cited

Embassy of Tajikistan to Pakistan, 2010, Mineral resources: Embassy of Tajikistan to Pakistan. (Accessed June 15, 2010, at http://www.tajikembassy.pk/abt_tjk/mineralresources.aspx.)

Ibrozhim, Azim, Dzhanobilov, M.D., Mamadvafoev, M.M., Fakhurtdinov, R.S., and Gafarov, A.R., 2009, Mineral'no-syr'yevaya baza Zavershanskogo gornorudnogo regionov [The mineral-raw material base of the Zavershan mining region]: Gornyy Zhurnal [Mining Journal], no. 8, p. 12-16.

Interfax Russia & CIS Metals and Mining Weekly, 2007, Tajikistan to spend $14.5 mln on Rogun power plant in 2007: Interfax Russia & CIS Metals and Mining Weekly, issue 4, January 19-25, p. 33.

Interfax Russia & CIS Metals and Mining Weekly, 2010a, Tajikistan cuts aluminum production nearly 10% in 2009: Interfax Russia & CIS Metals and Mining Weekly, issue 2, January 15-21, p. 39.

Interfax Russia & CIS Metals and Mining Weekly, 2010b, Tajikistan sees gold production plummet 19% in 2009: Interfax Russia & CIS Metals and Mining Weekly, issue 3, January 22-28, p. 26.

Interfax Russia & CIS Statistics Weekly, 2010, Socio-economic surveys of CIS and Baltic countries: Interfax Russia & CIS Statistics Weekly, issue 8, February 20-26, p. 9.

Khasanov, A.Kh., 2009, Problemy i perspektivy razvitiya alyuminievo-glinozemnogo proizvodsvtva [Problems and perspectives for the development of the aluminum-alumina industry]: Gornyy Zhurnal [Mining Journal], no. 8, p. 24-28.

Mukherjee, Uddipan, 2009, Presidential visit to Tajikistan—India among the Pamirs?: Institute of Peace & Conflict Studies, September 22. (Accessed June 14, 2010, at http://www.ipcs.org/article_details.php?articleNo=2972.)

Najibullah, Farangis, 2007, Central Asia—Tajikistan's much needed electricity stalled in Uzbekistan: EurasiaNet.org, November 2. (Accessed November 3, 2009, at http://www.eurasianet.org/departments/insight/articles/pp110307.shtml.)

Najibullah, Farangis, 2008, Tajikistan—Energy shortages, extreme cold create crisis situation: EurasiaNet.org, January 12. (Accessed March 20, 2009, at http://www.eurasianet.org/departments/insight/articles/pp011308.shtml.)

New Europe, 2008, China's company eyes uranium deposits in Tajikistan: New Europe, issue 791, July 21. (Accessed February 26, 2010, at http://www.neurope.eu/articles/89015.php.)

Orifov, A.O., 2001, Sostoyaniye I perspektivy razrabotki mestorozhdeniy poleznyk iskopaemykh Tadzhikistana [The condition and prospects for the development of Tajikistan's mineral deposits]: Gornyy Zhurnal [Mining Journal], no. 10, p. 117-122.

Upadhya, Ramakrishna, 2009, President Patil's visit to ex-Soviet state brings significant gain—India to explore uranium in Tajikistan: Deccan Herald, September 10. (Accessed June 15, 2010, at http://www.deccanherald.com/content/24350/india-explore-uranium-tajikistan.html.)

WISE Uranium Project, 2008, New uranium mining projects—Asia—Tajikistan: WISE Uranium Project, August 29. (Accessed February 26, 2010, at http://www.wise-uranium.org/upasi.html.)

WISE Uranium Project, 2009, Decommissioning projects—Asia: WISE Uranium Project, October 9. (Accessed February 26, 2010, at http://www.wise-uranium.org/udasi.html.)

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TABLE 1

TAJIKISTAN: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007[e]	2008[e]	2009[e]
METALS						
Aluminum, primary		379,630	413,800	419,060 [3]	399,450 [3]	359,385 [3]
Antimony, Sb content of concentrate		4,073	3,480	2,000	2,000	2,000
Gold	kilograms	1,927	1,920	2,000 [r,e]	1,672 [r,3]	1,361 [3]
Lead, Pb content of concentrate[e]		800	800	800	800	800
Mercury, Hg content of concentrate[e]		30	30	30	30	30
Silver, Ag content of concentrate[e]	kilograms	5,000	5,000	5,000	5,000	4,500
INDUSTRIAL MINERALS						
Cement		253,100	281,500	313,100 [r,3]	190,400 [3]	190,000
Fluorspar[e]		8,500	8,500	8,500	8,500	8,500
Gypsum		8,500	8,500	8,500	8,500	8,500
Nitrogen, N content of ammonia[e]		45,000	35,000	25,000	25,000	25,000
Salt		65,992	52,459	52,000	52,000	52,000
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Bituminous		98,500	102,400	81,600 [3]	166,000 [r]	142,100 [3]
Lignite		(4)	(4)	(4)	32,800	34,500 [3]
Natural gas	thousand cubic meters	29,300	19,900	19,000	16,100 [r]	21,800 [3]
Petroleum, crude		21,600	22,300	22,500	25,800 [r]	26,100 [3]

[e]Estimated; estimated data are rounded to no more than three significant digits. [r]Revised.

[1]Table includes data available through June 15, 2010.

[2]In addition to the commodities listed, Tajikistan produces a number of other mineral commodities for which information is not adequate to determine if production was still taking place.

[3]Reported figure.

[4]Available information is not adequate to determine a reliable production estimate.

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TABLE 2

TAJIKISTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

(Metric tons unless otherwise specified)

Commodity		Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity[e]
Aluminum		Tajikistan Aluminum Co. (TALCO) aluminum smelter [formerly Tajikistan Aluminum Smelter (TadAZ)]	Tursunzade	517,000
Antimony:				
Ore		Anzob mining and beneficiation complex	Dzhidzhikrutskoye antimony-mercury deposit	700,000
Metal		Isfara hydrometallurgical plant	Isfara	500
Arsenic		Mosrif deposit	NA	NA
Bismuth		Isfara hydrometallurgical plant	Isfara	500
Do.		Leninabad mining and beneficiation complex	Yuzhno-Yangikanskiy deposit	25
Bismuth, copper, fluorspar, gold, silver, zinc (ore processing)		Adrasman mining and beneficiation complex	Kanimansurskoye deposit	650,000
Boron		Yakarkharskoye deposit	Kuhistoni Badakhshon	NA
Coal		Fan-Yagnob hard coal deposits	Pyandzhskir region	50,000
Do.		Isfara hydrometallurgical plant	Isfara	300,000
Do.		Shurab brown coal deposit	Shurob region	NA
Copper-lead-zinc		Leninabad mining and beneficiation complex	Yuzhno-Yangikanskiy deposit	2,500
Dolomite		Yavan electrochemical complex	Pashkharvoskoye deposit	NA
Fluorspar, concentrate		Takob mining and beneficiation complex	Takob and Krasnye Kholmy deposits	60,000 e
Gold:				
Au content of ore	kilograms	Aprelevka joint venture	Aprelevka deposit	200
Do.	do.	Darvaz joint venture	Yak-Suyskoye deposit, Khatlon region	2,000
Do.	do.	Tajikzoloto mining and beneficiation complex, Pamir Artel	Darvazy and Rankul placer deposits, placers in central and southern parts of the country	5,000 e
Do.	do.	Zerafshan Gold Co. (Zijin Mining Group, 75%)	Dzhilau and Taror deposits, Sughd region	2,500 e
Ore processing	do.	Kansayskaya mill	Aprelevka, Burgunda, Kyzyl-Chek, and Shkol'noye deposits	165,000 e
Refined	do.	Vostokredmet refinery	Qiztaquz	NA
Lead-zinc		Adrasman mining and beneficiation complex	NA	NA
Do.		Altyn-Topkan mining directorate (China Global New Technology Export and Import)	Altyn-Topkan deposit (mining ceased in 1997)	NA
Do.		do.	Pay Bulak deposit (mining ceased in 1997)	NA
Do.		Kansayskoye mining complex	Karamazor region	NA
Do.		Takaeliyskiy metallurgical complex	NA	NA
Limestone		Dushanbe cement complex	Kharangonskoye deposit	NA
Loam		do.	Varzobskoye Ushchel'ye deposit	NA
Marble		Dal'yan Bolo deposit	Ganchinskiy region	NA
Do.		Dashtak deposit	Darvaz region	NA
Do.		Jilikul deposit	Pendzhikentskiy region	NA
Mercury		Anzob mining and beneficiation complex	Dzhizhikrutskoye deposit	150
Natural gas and petroleum:				
Natural gas	thousand cubic meters	Sixteen oil-gas deposits under exploration, which include Ayritanskoye, Madaniyatskoye, and Ravatskoye	Fergana valley	200,000 e
Petroleum		Beshtentyakskoye, Kichik-Belskoye, Shaambary, and Uzunkhorskoye deposits	Southern Tajik depression	200,000 e
Salt		Ashtskiy plant	Kamyshkurganskoye deposit	NA
Do.		Khoja-Sartez, Samanchi, and Tanabchi deposits	NA	NA
Do.		Voseyskiy plant	Khodzha-Muminskoye deposit	NA
Do.		Yavan electrochemical complex	Tut-Bulakskoye deposit	NA
Silver	kilograms	Adrasman mining and beneficiation complex	Bolshoy Kanimansur deposit	15,000

See footnotes at end of table.

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TABLE 2—Continued

TAJIKISTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity[e]
Strontium, ore	Chaltash, Chilkutan, and Davgir deposits	Khatlon region	180,000
Tin-tungsten	Tafkon deposit	NA	NA
Tungsten ore	Maykhura deposit	Central Tajikistan	150,000

[e]Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

[1]Many location names have changed since the breakup of the Soviet Union. Many enterprises, however, are still named or commonly referred to based on the former location name, which accounts for discrepancies in the names of enterprises and their locations.

[2]Capacity estimate is the total for all enterprises that produce this commodity.

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The Mineral Industry of Turkmenistan

By Richard M. Levine

Although Turkmenistan produces a wide range of industrial minerals, its major mineral resources are its oil and gas. The country is a leading regional natural gas producer; Turkmenistan has several of the world's largest gasfields, which include the Dauletabad-Donmez, which was brought into production in 1982, and the Shatlyk, which was brought into production in the early 1970s. Turkmenistan has two oil refining centers—the Turkmenbashi complex of oil refineries and the Seydi oil refinery.

The country's leading nonfuel mineral operations were the Arpaklenskiy barite-witherite enterprise, the Cheleken ozokerite (a naturally occurring odoriferous mineral wax) enterprise, the Gaurdak sulfur plant, the Karabogazsulfate association, the Kara-Kum sulfur plant, and the Oglanly bentonite mining enterprises. One of the leading enterprises that extracted chemical raw materials was the Karabogazsulfate association, which recovered salts from the Kara-Bogaz-Gol lagoon off the Caspian Sea. The association produced bischofite, Caspian Sea salt, epsomite, Glauber's salt, and sodium sulfate. In the western part of the country, iodine-bromine brines were extracted at the Boyadagskoye, the Cheleken, and the Nebitdag deposits and then processed at the Cheleken and the Nebitdag iodine-bromine plants.

The State Corporation Turkmengeologiya was founded in 1938 and has since engaged in systematic large-scale studies of the geologic structure of Turkmenistan. During its more than 70 years of existence, Turkmengeologiya has discovered more than 600 mineral deposits, including bentonite, celestine, cement raw materials, coal, iodine-bromine, kaolin, native paraffin, natural gas, petroleum, potash, sodium sulfate, sulfur, and table salt, and prepared them for development. Turkmengeologiya engages in exploration and maintains data about the geologic structure and mineral resources of Turkmenistan. It also conducts geologic studies in Turkmenistan's sector of the Caspian Sea. Since 1991, when Turkmenistan became an independent state, the country's geologists have continued to provide data on the country's mineral resources to support the development of new industrial enterprises and the expansion of existing enterprises (State Corporation Turkmengeologiya, The, 2010). As of 2009, more than 1,000 oil and gas structures and more than 150 fields had been discovered in Turkmenistan onshore and offshore, although only one-third of these structures and fields were under development (Interfax Russia & CIS Oil and Gas Weekly, 2009c).

Prospectors from Tukmengeologiya discovered a number of major deposits, which included the Oglany bentonitic clay deposit; the Arik and Sakyrhmin celestine deposit; the Tuarkyr coal deposit; the Dauletabad-Donmez gas condensate field; the Garabil-Gurrukbil, the Garadzhaovlak, the South Yolotan–Osman, the Yashlar, and the Zeagli-Darvaza gas and oil deposits; the Boyadag and the Nebitdag-Monzhuklin iodide-bromine brines; the Kyzylkainskoye kaolin deposit; the Karlyuk and the Karabil potassium salts deposits; and the Gaurdak sulfur deposit. The latest versions of geologic maps of Turkmenistan were published on scales of 1:500,000 and 1:1,000,000. Turkmengeologiya employed 8,200 specialists, of which 1,500 were engineers and technicians. Twenty-five employees held doctorate and candidate of science degrees (State Corporation Turkmengeologiya, The, 2010).

Production

Production data and other information regarding mineral production for most mineral commodities except natural gas and oil have not been available for a number of years. Consequently, production estimates in table 1 generally reflect past levels of production. In 2009, for the first time in many years, data on natural gas and oil production do not appear to have been reported. Because Turkmenistan discontinued its exports of gas though Russia as of April 9, 2009, it is assumed that there was a commensurate precipitous decline in Turkmenistan's natural gas production.

Structure of the Mineral Industry

All mineral production enterprises were state owned and all deposits were being developed by enterprises subordinate to the state and its ministries. Based on a law passed in 1992, foreign firms were permitted to establish joint ventures only with state-owned companies. In 2007, the President of Turkmenistan stated that a new version of the Turkmenistan Constitution should be drafted and that the new version must bar the sale of the country's mineral resources to private interests. The new Constitution, he said, should clearly state that all natural and mineral resources of the country are part of the national wealth and may not become private property and that the right to sell or pledge these resources must remain with the Government. The Government, in turn, must ensure care for the environment, and must encourage the population to develop a pro-environment mentality and behavior. He also stated that the new Constitution should rule out the slightest possibility of discrimination in the hiring of Turkmenistan's citizens by foreign companies, and that citizens must be paid the same salary as foreign employees who do the same amount and type of work (Trend, 2008).

Commodity Review

Industrial Minerals

Bromine and Iodine.—Turkmenistan refloated tenders for two projects to develop bromine and iodine production facilities. Bidding would be for designing and constructing turnkey production facilities to produce 350 metric tons per year (t/yr) of iodine and 5,500 t/yr of bromine in the Hazar area and 300 t/yr of iodine and 2,800 t/yr of bromine in the Boyadag area (News Central Asia, 2009b).

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Natural Gas.—The country's natural gas output was estimated to have declined by about one-half in 2009 compared with that of 2008 owing to Turkmenistan discontinuing gas exports through Russia. On April 9, 2009, an explosion on the Central Asia Center (CAC)-4 pipeline reduced the supply of Turkmenistan's gas to Russia by almost 90%. CAC-4 was one of five main trunk pipelines that constituted the CAC pipeline network. The explosion took place at the Ilyak-Deeryalyk section of the pipeline. Turkmenistan officials explained that the explosion happened because the Government was given insufficient notice by GazpromExport (the Gazprom subsidiary that handled the purchase of gas from Turkmenistan) of a sharp reduction in the volume of gas that it would buy (Interfax Russia & CIS Oil and Gas Weekly, 2009b, News Central Asia, 2009a). Some analysts have said, however, that they doubt that low pressure could have caused the blast and that pipelines do not explode from low pressure; for example, they said that in January 2009, when Russia fully cut its gas shipment to Ukraine, there was no resulting explosion (Reuters, 2009).

On December 22, 2009, Russia and Turkmenistan reached an agreement on the resumption of Turkmenistan's gas supplies at an annual rate of up to 30 billion cubic meters. On January 9, 2010, Turkmenistan restarted natural gas shipments to Russia (Interfax Russia & CIS Oil and Gas Weekly, 2010).

In December 2009, the Government of Turkmenistan commissioned the Turkmenistan-Uzbekistan-Kazakhstan-China pipeline, which would enable Turkmenistan to export up to 40 billion cubic meters per year of natural gas to China for the next 30 years. Turkmenistan also commissioned a second gas pipeline to Iran at the start of 2010; this pipeline would be capable of transporting up to 20 billion cubic meters per year of natural gas. Turkmenistan's first pipeline to Iran could transport up to 20 billion cubic meters per year of natural gas, but in 2009, only about 8 billion cubic meters was exported to Iran through this pipeline (Interfax Russia & CIS Oil and Gas Weekly, 2010).

Outlook

The chairman of Turkmengaz's projections of almost doubling gas production to 120 billion cubic meters in 2010 and then more than tripling production to 240 billion cubic meters by 2030 would require the country to attract additional foreign investment. Turkmenistan stated that it is interested in broad international cooperation to implement large investment projects in Turkmenistan's sector of the Caspian Sea on a production-sharing-agreement basis. Such projects would involve not only gasfield and oilfield development, but also construction of gas transport facilities, rehabilitation of existing gas and oil wells, modernization of refining facilities, and the acquisition of updated equipment and technology (Interfax Russia & CIS Oil and Gas Weekly, 2008).

Turkmenistan planned to increase its gas exports, which would require developing new pipeline routes. The U.S. Assistant Secretary for South and Central Asian Affairs stated that the United States backed diversification of energy markets and transit routes for Central Asian countries and that this diversification should not be at the expense of traditional trade ties but rather could potentially intensify these ties (Interfax Russia & CIS Oil and Gas Weekly, 2009d).

While attending the 64th session of the United Nations General Assembly in New York, the President of Turkmenistan and the U.S. Secretary of State described the energy sector as a priority area for cooperation between the two countries. The U.S. Secretary of State declared the U.S. Government's readiness to support and contribute to measures designed to diversify Turkmenistan's energy sources, which could include using the experience of U.S. companies in applying state-of-the-art technology (Interfax Russia & CIS Oil and Gas Weekly, 2009e).

While attending a business forum in New York City, the President of Turkmenistan invited American businesses to invest in local-level energy projects in Turkmenistan. Priorities for investment, the President stated, would be for the appraisal and development of hydrocarbon fields, massive development of Turkmenistan's sector of the Caspian sea, and the modernization of petroleum refineries. He stated that Turkmenistan has more than 1,000 prospective oil and gas fields, including the South Yolotan-Osman field, which an independent audit company had suggested was the world's fourth largest gasfield. The President said that Turkmenistan's sector of the Caspian Sea, could be divided into 32 blocks. Some of these blocks were already producing oil and gas under production-sharing agreements. He stated that he would welcome the participation of certain American energy companies (Interfax Russia & CIS Oil and Gas Weekly, 2009a).

References Cited

Interfax Russia & CIS Oil and Gas Weekly, 2008, Turkmenistan ups gas, oil output 9% in 2007: Interfax Russia & CIS Oil and Gas Weekly, issue 11, March 27-April 2, p. 40.

Interfax Russia & CIS Oil and Gas Weekly, 2009a, Turkmenistan accuses Gazprom affiliate of creating conditions for pipeline accident: Interfax Russia & CIS Oil and Gas Weekly, issue 14, April 9-15, p. 14-16.

Interfax Russia & CIS Oil and Gas Weekly, 2009b, Turkmenistan reports gas discovery in Central Karakum: Interfax Russia & CIS Oil and Gas Weekly, issue 42, October 22-28, p. 33.

Interfax Russia & CIS Oil and Gas Weekly, 2009c, Turkmenistan to build up natural gas exports—Europe interested: Interfax Russia & CIS Oil and Gas Weekly, issue 16, April 23-29, p. 29, 30.

Interfax Russia & CIS Oil and Gas Weekly, 2009d, Turkmen-U.S. cooperation focused on energy—Bermimuhamedow: Interfax Russia & CIS Oil and Gas Weekly, issue 38, September 24-30, p. 32.

Interfax Russia & CIS Oil and Gas Weekly, 2009e, U.S. ready to help Turkmenistan diversify its energy sources: Interfax Russia & CIS Oil and Gas Weekly, issue 37, September 17-23, p. 29, 30.

Interfax Russia & CIS Oil and Gas Weekly, 2010, Turkmenistan restarts gas shipments to Russia: Interfax Russia & CIS Oil and Gas Weekly, issue 1, December 31, 2009-January 13, 2010, p. 31.

News Central Asia, 2009a, Turkmenistan gas pipeline explosion—The larger context: News Central Asia, April 11. (Accessed July 12, 2010, at http://www.newscentralasia.net/moreNews.php?nID=396#.)

News Central Asia, 2009b, Turkmenistan re-floats tender for iodine and bromine plants: News Central Asia, July 23. (Accessed July 12, 2010, at http://www.newscentralasia.net/moreNews.php?nID=44#.)

Reuters, 2009, UPDATE 4—Pipeline blast halts Turkmen gas exports to Russia: Thomson Reuters, April 9. (Accessed June 27, 2010, at http://www.reuters.com article/idUSL959981620090409.)

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State Corporation Turkmengeologiya, The, 2010, Home page: The State Corporation Tukmengeologiya. (Accessed July 13, 2010, at http://expo2010.cci.gov.tm/index.php?option=com_content&view=article&id=61:the-state-corporation-lturkmengeologiyar&catid=29:the-cms.)

Trend, 2008, Turkmenistan's mineral resources should not be privately owned—President Berdimuhammedow: Trend News Agency, May 23. (Accessed June 25, 2010, at http://en.trend.az/news/cis/turkmenistan/1206927.html.)

TABLE I

TURKMENISTAN: ESTIMATED PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Metric tons unless otherwise specified)

Commodity[3]		2005	2006	2007	2008	2009
INDUSTRIAL MINERALS						
Bentonite		50,000	50,000	50,000	50,000	50,000
Bentonite powder		250	250	250	250	250
Bischofite		100	100	100	100	100
Bromine	kilograms	150,000	150,000	150,000	150,000	150,000
Cement		696,000 r, 4	920,600 r, 4	941,000 r, 4	1,025,000 r, 4	1,100,000 4
Epsomite		NA	NA	NA	NA	NA
Ferrous bromide, 51% Br		85	85	85	85	85
Gypsum		100,000	100,000	100,000	100,000	100,000
Iodine		270,000	270,000	270,000	270,000	270,000
Lime		16,000	16,000	16,000	16,000	16,000
Nitrogen, N content of ammonia		220,000	250,000	270,000	270,000	270,000
Salt		215,000	215,000	215,000	215,000	215,000
Sodium sulfate		60,000	60,000	60,000	60,000	60,000
Sulfur		9,000	9,000	9,000	9,000	9,000
MINERAL FUELS AND RELATED MATERIALS						
Natural gas	million cubic meters	60,420 4	63,201 4	72,300 4	70,501 4	38,000
Petroleum						
Crude		9,700,000 4	8,950,000 4	9,750,000 4	9,678,000 4	10,000,000
Refined		6,037,000 4	6,500,000	7,000,000	7,300,000 4	7,600,000

rRevised. NA Not available.

[1]Estimated data are rounded to no more than three significant digits.

[2]Table includes data available through July 13, 2010.

[3]In addition to the commodities listed, argillite, barite, clay, coal, dolomite, limestone, ozokerite, potash, sand and gravel, silica sand, and strontium (celestite) may be produced, but available information is inadequate to estimate output.

[4]Reported figure.

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TABLE 2

TURKMENISTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1, 2]

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity
Ammonia thousand metric tons	Maryzoat Association	Mary region	400,000
Argillite cubic meters	Keramzit plant	Yagmanskoye deposit	200,000
Barite-witherite	Arpaklenskiy mining enterprise	Arpaklen deposit	10,000
Do.	Kumytash deposit and other deposits	NA	NA
Bench gravel and loam:			
Bench gravel	Bezmeinskiy deposit	Near Asgabast	1,200,000
Loam	do.	do.	12,000
Bischofite, epsomite, Caspian Sea salt, Glauber's salt	Karabogazsulfate Association	Kara-Bogaz-Gol Lagoon, off the Caspian Sea	NA
Bromine	Cheleken plant	Celeken region	4,740
Do.	Nebitdag plant	Balkanabat region	2,370
Cement	Bakharlinskiy cement plant	South of Kelyata train station	1,000,000
Do.	Bezmeinskiy cement plant	Kelyata	1,400,000
Clays:			
Bentonite	Oglanly Mine	Oglanly region	100,000
Kaolin	Ashkhabad glass plant	Kyzylkainskoye deposit	80,000 e
Do.	Tuarkyrskoye deposit	250 kilometers southeast of Turkmenbasy	NA
Dolomite	Ashkhabad glass plant	Kelyatinskoye deposit	NA
Gypsum	IA Turkmenmineral	Mukry, Tagorin deposits	NA
Do.	Wastes from Gaurdak sulfur deposit	Gaurdak, Gora	NA
Do.	Krasnovodsk Aylagy (anhydride) deposit	9 kilometers east of Turkmenbasy	NA
Iodine	Cheleken plant	Celeken region	NA
Do.	Nebitdag plant	Balkanabat region	NA
Limestone	Deposits:		
Do.	Gaurdak	4 kilometers northeast of Gowurdak	NA
Do.	Kara-Dzhumalakskoye	60 kilometers from Gowurdak	NA
Limestone, for facing materials	Charshanginskoye, Gaurdakskoye, Geok-Tepinskoye, Kaylyu, Krasnovodsk Aylagy (tuff and granite), and Tyuzmergenskoye deposits	NA	NA
Do. cubic meters	Tagarinskoye deposit	8 kilometers from Gowuirdak	1,000 e
Limestone, for filling stone do.	Aeroport deposit	21 kilometers northeast of Turkmenbasy	2,000
Do. do.	Bekdashskoye deposit	200 kilometers north of Turkmenbasy	5,000
Do. do.	Dostluksoye deposit	230 kilometers southeast of Turkmenbasy	2,000
Do. do.	Mukrinskoye deposit	60 kilometers southwest of Gowurdak	25,000
Natural gas million cubic meters	Achakskoye, Dauletabad-Donmez, Gygyrlinskoye, Yolotan (South Yolotan-Osman), North and South Naipskiye, Shatlyk, and Yashlar deposits	Onshore in eastern and southwestern parts of country and offshore in Caspian Sea; Amu-Dar'ya and Murgab Basins; Dashoguzskiy, Lebapskiy, Maryyskiy deposits	90,000 e, 3
Ozokerite	Cheleken mining enterprise	Celeken region	NA
Petroleum:			
Crude thousand metric tons	Barsa-Gelmesskoye, Burunskoye, Cheleken, Gograndagskoye, Ioltan (South Yolotan-Osman), Kamyshldzhinskoye, Korturtepinskoye, Kum Dag, Kuydzhikskoye, Okaremskoye, and Yashlar deposits	Centered in Caspian plain in west Turkmenistan and in offshore oilfields to the west of Cheleken Peninsula in Caspian Sea	11,000 e, 3
Refined do.	Seydi oil refinery	Turkmenabat region	5,000
Do. do.	Turkmenbashi complex of oil refineries	Turkmenbasy	6,000
Potash (sylvinite, carnallite)	Karabil'skoye deposit	17 kilometers south of Gowurdak	NA
Quartz sand	Annauskoye, Babadurmazskoye, Bakhardenskoye, and Kelyatinskoye deposits	NA	NA

See footnotes at end of table.

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TABLE 2—Continued

TURKMENISTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1, 2]

(Metric tons unless otherwise specified)

Commodity		Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity
Rock salt		Gaurdak deposit	8 kilometers from Gowurdak	15,000 e
Do.		Khodzhaguymaskoye deposit	4 kilometers west of Gowurdak	NA
Do.		Kugitangskoye deposit	75 kilometers from Gowurdak	2,000 e
Do.		Uzun-Kudukskoye deposit	20 kilometers from Gowurdak	2,000 e
Salt		Kuulinskoye deposit	40 kilometers north of Turkmenbasy	650,000 e
Sand and gravel	cubic meters	Dushaksoye deposit	NA	1,150,000
Do.	do.	Kala-I-Morskoye deposit	NA	925,000
Do.	do.	Kernayskoye deposit	NA	36,000
Do.	do.	Kubatayskoye deposit	NA	740,000
Do.	do.	Ufrinskoye deposit	NA	900,000
Sodium sulfate		Karabogazsulfate Association	Bekdash, Kara-Bogaz-Gol Lagoon (off Caspian Sea)	400,000
Strontium (celesite)		Shakhtaminskoye deposit	Near Gowurdak	NA
Sulfur		Darvaza, Segli-Kar, and Kara-Kum sulfur plants	Kara-kum deposit (mining ceased 1962)	NA
Do.		Gaurdak plant	Gaurdak deposit (mining ceased 1997)	500,000 e
Do.		IA Turkmenmineral	Gora deposit	340,000
Do.		Kugitangskoye deposit	75 kilometers from Gowurdag	NA

eEstimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

[1]Many location names have changed since the breakup of the Soviet Union. Many enterprises and deposits, however, are still named or commonly referred to based on the former location name, which accounts for discrepancies in the names of enterprises and that of locations.

[2]Data are not adequate to determine if production took place.

[3]Capacity estimate is the total for all enterprises that produce this commodity.

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THE MINERAL INDUSTRY OF UKRAINE

By Mark Brininstool

Ukraine was a major world producer of such minerals as bromine, gallium, graphite, iron ore, manganese ore, pig iron, steel, titanium concentrates (ilmenite and rutile), and titanium. The country had large coal reserves but was dependent on imports to satisfy most of its petroleum and natural gas demand. Ukraine was also an important transit country for natural gas and petroleum from Central Asia and Russia to Europe (Apodaca, 2010; Corathers, 2010; Fenton, 2010; Gambogi, 2010; Jaskula, 2010; Jorgenson, 2010; Olson, 2010).

Minerals in the National Economy

In 2009, Ukraine's real gross domestic product (GDP) decreased by 15.1% compared with that of 2008. The State Statistics Committee of Ukraine reported that, in 2009, mining and quarrying activities accounted for about 3.87% of the GDP, and manufacturing, 15.85%. The value of minerals and metals processing activities as a percentage of the GDP was not reported by the State Statistics Committee, but news reports stated, that in 2007, the mining and metals industry accounted for 27% of the GDP. It was not known if this figure included the value of finished products or other items not included in this report, but the figure acts as a good general indicator of the importance of Ukraine's mineral industry for the country's economy (Chernovalov, 2008; State Statistics Committee of Ukraine, 2010c, f).

The total value of Ukraine's exports was about $67 billion (44.7% of the GDP) in 2008 and $40 billion (46.3% of the GDP) in 2009. Ukraine's leading export in terms of value was ferrous metals, and in 2008, exports of ferrous metals were valued at $26.49 billion (39.6% of the total value of exports), and in 2009, the value of ferrous metals exports had dropped to $12.20 billion and made up 30.7% of the total value of exports. The value of ferrous metal exports decreased by about 54% compared with that of 2008 because demand for steel in most countries had decreased owing to reduced economic activity as a result of the world financial crisis. The value of exports of mineral products and metals made up about 42% of the value of total exports. The leading import commodities were mineral fuels and refined petroleum products, which made up about 32% of the value of total imports. Natural gas was the leading individual import product in terms of value and accounted for 17.6% of the value of total imports. Ukraine consumed 51.9 billion cubic meters of natural gas in 2009 and 66.3 billion cubic meters in 2008; imports of natural gas from Russia made up about 60% of total natural gas consumed each year (State Statistics Committee of Ukraine, 2009; 2010a-c; JSC Naftogaz of Ukraine, 2010).

The mineral industry was also important in terms of employment. In 2009, it was reported that about 500,000 people were employed by the mining and metals industry in Ukraine. About 350,000 of those people were employed in the coal mining industry (Chernovalov, 2008; Coal Industry Workers' Union of Ukraine, 2011).

Government Policies and Programs

Government policies aimed at the mining and metallurgy industry in 2009 focused on supporting companies during the economic downturn that began in 2008 and continued into 2009. Government support came mainly from a memorandum of understanding between the Government and the chemical and mining and metallurgy industries based on the Cabinet of Ministers' Decree No. 925 of November 2008. The decree's main benefits to the industry were that it granted mining and metallurgy companies a moratorium on any increase in tariffs for rail transport, imposed restrictions on any increase in natural gas prices, and held the price of electricity at the level of November 1, 2008 (Metall Ukrainy, 2009b, p. 5; 2009d, p. 8-9).

The Government also instituted support for the coal industry, which had traditionally received special attention from the Government because of the large number of people employed in the coal mining industry, coal's position in energy security, and the fact that many coal mining companies were owned by the Government. In March, the Cabinet of Ministers assigned about $98 million[1] to the establishment of a reserve of coal for energy production in order to boost coal prices by increasing demand. In the beginning of 2009, purchases of coal by the energy sector were down by about 20% because reduced economic activity in Ukraine had decreased the demand for electricity (Metall Ukrainy, 2009c, p. 53).

Production

In 2009, production of most minerals decreased significantly owing to reduced demand for mineral products during the slowdown in economic activity that began as a result of the world financial crisis. Production of primary aluminum production decreased by 56%; manganese ore, by 36%; total ferroalloys, by an estimated 28%; crude steel, by 20%; and iron ore, by 9%. Cement production was reported to have decreased by 36% in 2009, and production of most other industrial minerals decreased, most likely owing mainly to a decrease in construction activity, presumably as a result of a lack of available financing during the economic crisis and greater caution on the part of potential investors. Completion of residential building projects (measured in thousand cubic meters) decreased by 39% compared with that of 2008 (table 1; State Statistics Committee of Ukraine, 2010e).

Mineral Trade

On January 1, disputes concerning the payment of debts owed by JSC Naftogaz of Ukraine to OAO Gazprom of Russia for the purchase of natural gas and the inability of the two companies

[1]Where necessary, values have been converted from Ukrainian hryvnias (HRV) to U.S. dollars (US$) at the rate of HRV8.14=US$1.00.

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to reach an agreement on natural gas purchase and transit prices resulted in Gazprom halting deliveries of natural gas intended for Ukrainian consumers. Gazprom had demanded the payment of about $2 billion owed for natural gas delivered in November and December 2008 and late payment fees, but Naftogaz of Ukraine claimed that it had paid all its debts to Gazprom. A complicated payment system that involved intermediaries made it difficult for outside observers to determine which payments had or had not been made. Before January 1, during price negotiations for natural gas supplies to Ukraine, Naftogaz of Ukraine had rejected a price offer from Gazprom of $250 per thousand cubic meters of natural gas and Gazprom announced that it could potentially charge Ukraine the European market price of $418 per thousand cubic meters. By comparison, in 2008, Ukraine paid $179.50 per thousand cubic meters for natural gas from Russia; in 2007, $130; and in 2006, $95. On January 7, Gazprom discontinued the transit through Ukraine of natural gas intended for other European consumers after accusing Ukraine of siphoning off this gas for domestic use; Naftogaz of Ukraine disputed this allegation (Interfax Ltd., 2008, p. 12; JSC Naftogaz of Ukraine, 2009; OAO Gazprom, 2009a, b).

On January 19, the Governments of Russia and Ukraine signed a 10-year agreement on natural gas supplies, and on January 20, Gazprom restarted deliveries of natural gas to Ukraine. According to the terms of the agreement, Ukraine would pay the European market price for natural gas with a 20% discount in 2009 (with the price to be adjusted quarterly), and in 2010, Ukraine would begin paying the full European market price. As a result of the agreement, Ukraine paid an average of $228 per thousand cubic meters of natural gas in 2009 (OAO Gazprom, 2009c; RBC Ukraine, 2009).

Structure of the Mineral Industry

As in many of the countries that had made up the Soviet Union, ownership and control of mineral production facilities in Ukraine in 2009 were not always completely transparent, but understanding the ownership issues is important for understanding the actions of industry participants. According to news reports, Ukrainian companies or their owners often established holding companies outside of Ukraine in order to purchase mineral production facilities and control their activities through indirect ownership. Therefore, when discussing a particular company, news reports often referred to companies as being "controlled by" instead of "owned by" another entity to avoid an unnecessarily detailed explanation of the ownership structure. This report and table 2 use this method to show the companies that actually control various facilities without showing specific shareholders.

A good example of this indirect method used to control mineral production facilities was the PrivatBank Group's control of Ukraine's manganese production and of virtually all Ukraine's ferroalloys production. The PrivatBank Group's control of Ukraine's two manganese mining companies at Marganets and Ordzhonikidze and three ferroalloys plants at Nikopol, Stakhanov, and Zaporozhye was widely reported, but the exact nature of ownership was difficult to determine. The shares of most of these facilities were owned by a number of privately held companies based in Cyprus that were widely reported to have been owned by the principle shareholders of PrivatBank, which gave the PrivatBank Group effective control over the facilities without having direct ownership of them (table 2; Ignatenko, 2009).

Another important aspect of the structure of the Ukrainian mineral industry was that major production facilities were usually controlled by Ukrainian conglomerates with financial and industrial assets (know as financial-industrial groups) or by Russian companies. The leading Ukrainian financial-industrial group in terms of production of mineral commodities was System Capital Management, which controlled assets in finance, power generation and distribution, telecommunications, media, and real estate in Ukraine, and, through its holding company, Metinvest B.V. and through Donbass Fuel and Energy Co. held important mining and metals production facilities. In 2009, companies owned by System Capital Management and Metinvest accounted for about 42% of coal production in Ukraine, an estimated 40% of iron ore production, and about 24% of coke and crude steel production. In table 2, JSC Makevskii Iron and Steel Works was removed from the list of crude steel producers as it seemed to have stopped production of crude steel in 2008 but continued to produce rolled metal products. The plant was obtained by Metinvest in 2007 when Smart Holdings of Ukraine sold its mining and metallurgical assets to Metinvest (table 1; Metinvest B.V., 2007; 2010, p. 2, 42; Donbass Fuel and Energy Co., 2010, p. 38; System Capital Management, 2011).

In the beginning of January 2010, the shareholders of the Industrial Union of Donbass Corp. (ISD Corp.) completed the sale of 50% plus 2 shares in the company to a group of three Russian investors. ISD was Ukraine's second ranked steel producer after Metinvest, and, in addition to its Ukrainian steel plants in Alchevsk and Dniprodzerzhinsk, ISD owned steel plants in Hungry and Poland. One of the Russian investors was identified as the owner of the Carbofer Group, which was based in Switzerland, but the other two investors were not officially named and news reports suggesting their identity could not be confirmed. The Russian state-owned bank Vnesheconombank financed the deal (Asankin, Chernovalov, and Kalnysh, 2010; Neverov, 2010).

Commodity Review

Metals

Iron and Steel.—Ukraine's iron and steel industry is the most significant part of the country's mining and metals industry in terms of its proportion of the GDP and in terms of the amount of export revenue it generates, but the industry is also remarkable for its inefficiencies and is greatly in need of investments. In 2008, Ukraine produced about 55% of steel in oxygen converter furnaces, 41% in open hearth furnaces, and 4% in electric arc furnaces (EAFs) and in 2009, Ukraine produced 69% of its steel in oxygen converter furnaces, 26% in open hearth furnaces, and 5% in EAFs. Ukrainian steel producers chose open hearth furnace production as the first production method

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to idle during the recession, and the decrease in production share did not seem to be the result of new investment in oxygen converter or EAF technology. Production of steel using open hearth furnaces is energy inefficient compared with oxygen converter or EAF production and takes place only in a few other countries, including Russia and India, which only produced 9.8% and 1.7%, respectively, of their steel in open hearth furnaces. In Ukraine, only 47.9% of steel in 2009 and 39.1% in 2008 was produced through continuous casting, which was the lowest percentage of any country in the world (World Steel Association, 2009, p. 10; 2010, p. 10-11).

Despite Ukraine's natural advantages of having large coal and iron ore deposits, inefficiencies in the steel industry have acted as a counterweight to some of those advantages. Since the dissolution of the Soviet Union, Ukraine had failed to undertake widespread modernization of its metals industry, which resulted in greater production costs owing to higher rates of energy use, less efficient use of raw materials, and other factors. As the economic crisis began to reduce demand for steel products, the higher production costs of Ukrainian steel producers meant that they had less flexibility to lower prices to the levels at which other countries were willing to sell steel products, thus increasing the harmful effects of the financial crisis on Ukraine's steel industry (Metall Ukrainy, 2008, p. 6-9).

Iron Ore.—In 2009, production of marketable iron ore and concentrate decreased by about 8.5% compared with that of 2008 owing to the world economic crisis that began in late 2008 and the accompanying decrease in demand for iron and steel products. In the first 6 months of the year, production averaged about 4.8 million metric tons per month (Mt/mo), but in the last 6 months of the year, production increased to about 6.3 Mt/mo as economic conditions in the world market improved. Production of iron ore did not decrease as sharply as steel production because Ukraine was able to increase its exports of iron ore products significantly to about 28.6 Mt, which was a 27.1% increase compared with exports in 2008. Although steel production declined in Central and Eastern Europe (the traditional recipients of Ukraine's iron ore exports), Ukraine was able to increase exports primarily owing to demand in China. In the first 6 months of the year, Ukraine exported about 6.5 Mt of iron ore products to China, which was more than twice as much as was exported to China in the same period in 2008. China could remain an important new market for Ukraine, but most likely countries in Central and Eastern Europe will remain Ukraine's most important iron ore importers owing mainly to lower transportation costs (Metall Ukrainy, 2009a, p. 40; 2009f, p. 43; 2010b, p. 39-40; Metinvest B.V., 2010, p. 13; State Statistics Committee of Ukraine, 2010d).

Manganese.—The Marganets Mining and Beneficiation Complex (GOK) and Ordzhonikidze GOK together produced about 932,000 Mt of manganese concentrates and marketable ore in 2008. Production of manganese declined significantly owing to a reduced demand for ferromanganese by the steel industry, and the Marganets and the Ordzhonikidze GOK halted production from November 2008 until April 2009 (Metall Ukrainy, 2009e, p. 44).

Manganese occupied an important place in the Ukrainian mining industry, not only for current production but also for potential future production. The undeveloped Velikotokmakskoye manganese deposit in Zaporizhia Oblast was reported to contain 1.5 billion metric tons of manganese ore containing 25.8% manganese and accounted for about 70% of Ukrainian manganese reserves. The Ministry for Environment and Natural Resources put sections of the Velikotokmakskoye manganese deposit up for auction on December 29, but cancelled the auction owing to a lack of investor interest. In 2008 and 2009, various potential projects by companies controlled by OJSC ArcelorMittal Kryviy Rih, ISD, and the PrivatBank Group to develop the Velikotokmakskoye deposit were reported, but none of these projects had reached the development stage (Kommersant Ukraina, 2009a; Metall Ukrainy, 2010c, p. 41).

In 2008, Steptekhservice CJSC had its license to develop part of the Velikotokmakskoye deposit revoked by the Ministry for Environment and Natural Resources. The Stepnogorskiy GOK was established by the Zaporizhia Oblast Administration to take over the sections of the Velikotokmakskoye deposit that were previously included in Steptekhservice's license (Ukrrudprom, 2008).

Titanium.—On February 27, the Cabinet of Ministers approved the formation of State Joint Stock Holding Co. (SJSHC) Titan Ukraine, which was a holding company for all the Government-controlled businesses related to the titanium industry, to form a vertically integrated company to undertake all aspects of titanium production. The idea of a Government-controlled vertically integrated titanium company had existed since the mid-1990s, but the realization of this plan in 2009 depended on the end of the lease held by Crimea Titan CJSC for the operation of the Government-owned Irshansk GOK and the Volnogorsk State Mining-Metals Complex, which were Ukraine's two main producers of ilmenite and rutile ore and concentrate (Kommersant Ukraina, 2009b).

Crimea Titan had held the lease for the operation of these two facilities since September 2004, but that lease expired in September 2009. Crimea Titan was owned 50% plus one share by the Government and 50% minus one share by OstChem Holdings, but the Government did not receive a dividend from the company and OstChem Holdings was in control of the company's management. Concentrate produced at Irshansk and Volnogorsk was available to Crimea Titan for the cost of production plus about $2.6 million per year for the lease of the two facilities and provided the company with a cheap source of raw materials. Crimea Titan used about 80% of the production of the ilmenite concentrates produced at Irshansk to produce titanium dioxide and it exported more than 80% of the rutile concentrates produced at Volnogorsk. In 2009, Ukraine exported 219,068 t of ilmenite and rutile ores and concentrates that was valued at $55.7 million. Of these exports, 65,615 t went to the Czech Republic; 54,985 t, to the United States; 43,133 t, to Russia; 15,112 t, to Canada; 12,692 t, to Kazakhstan; and 7,827 t, to the Netherlands (Kommersant Ukraina, 2009b; Metall Ukrainy, 2010a, p. 62).

To delay the return of its sources of raw materials to Government management, Crimea Titan's management blocked the taking of an inventory of the two facilities that was necessary to complete the transfer of the properties to

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Government control, asked for repayment for investments that Crimea Titan made in the Irshansk and the Volnogorsk facilities, and argued that its lease should be renewed. At the end of the year, Crimea Titan still controlled the Irshansk and the Volnogorsk facilities while the case proceeded through the courts. It was expected that the Government would eventually gain control of the disputed facilities but it was not known how long this would take (Karpenko, 2009).

Mineral Fuels and Related Materials

Coal.—According to the World Energy Council (WEC), Ukraine was the world's seventh ranked country in terms of total coal reserves. The WEC reported that Ukraine's total proved recoverable reserves at the end of 2008 were 33,873 Mt, of which 15,351 Mt was bituminous and anthracite, 16,577 Mt was subbituminous, and 1,945 Mt was lignite. Government-owned coal mining companies produced about 53% of all coal produced in Ukraine but production at Government-owned mines was generally inefficient and mines required subsidies from the Government to maintain production, leading to calls for privatization. On April 2, the Cabinet of Ministers of Ukraine passed a resolution that would have allowed 99 Government-owned coal mines to be auctioned off to private investors, but in September, the Constitutional Court of Ukraine found the resolution unconstitutional, and progress on the creation of a basic regulatory structure for the privatization of Government-owned coal mines was suspended (Ukrrudprom, 2009; Donbass Fuel and Energy Co., 2010, p. 38-39; World Energy Council, 2010).

Uranium.—Ukraine's uranium reserves were estimated to be between 130,000 t and 200,000 t, and the country was the ninth ranked producer of uranium in 2009. Nuclear powerplants (NPPs) in Ukraine accounted for 48% of all the electricity produced in the country in 2009 and domestic uranium production accounted for about 30% of all uranium used in Ukraine's NPPs. All uranium produced in Ukraine was sent to Russia for processing into nuclear fuel for use in Ukraine by JSC TVEL of Russia, and the remaining nuclear fuel required for Ukraine's NPPs was purchased from JSC TVEL (NNEGC Energoatom, 2010; World Nuclear Association, 2010a, b).

The Government of Ukraine had plans to increase uranium production to 1,000 t/yr in 2011, to 1,880 t/yr by 2015, and to about 4,800 t/yr by 2020. It was not entirely clear how all the new capacity would be developed, but in order for these production increases to take place, major investments would be necessary to develop new deposits. The main uranium deposits planned for development were the Novokonstantinovskoye deposit in Kirovohrad Oblast and the Safonovskoye deposit in Mykolaiv Oblast. The Novokonstantinovskoye deposit, which was the largest uranium deposit in Ukraine, had reserves of up to 100,000 t of uranium and its development project had a planned production capacity of up to 2,500 t/yr of uranium (with initial production of 1,500 t/yr of uranium) but would require an investment of about $900 million and would take about 7 years to develop fully. The development of the Safonovskoye deposit was expected to cost considerably less ($57 million) and could produce between 100 and 150 t/yr of uranium at full capacity within a few years. Obtaining financing for uranium deposit development projects had proved difficult in the past, especially because private investment was not possible owing to the designations of the projects as national security concerns, and could delay the development of these projects (Metall Ukrainy, 2009g; Sterkin and others, 2010; World Nuclear Association, 2010a).

Outlook

Production of metals in Ukraine could increase slightly in 2010 as the world economy continues to recover slowly from the effects of the world financial crisis. Investments in the metallurgy sector would be needed to improve the competitiveness of Ukrainian production, but it is difficult to say whether or not this will take place. The increasing price of natural gas imported from Russia will add further pressure to modernize and improve energy efficiency. It will also remain to be seen whether Ukraine will be able to increase its production of coal and uranium to increase security of resources for electricity production, given that past efforts to increase the production of mineral fuels have suffered from a lack of funding or faced other problems that have impeded resource development.

References Cited

Apodaca, L.E., 2010, Bromine: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 34-35.

Asankin, Roman, Chernovalov, Aleksandr, and Kalnysh, Valerij, 2010, Rossijane podelili Ukrainskuju stal [Russians divided the Ukrainian steel]: Kommersant, January 11. (Accessed January 12, 2011, at http://www.kommersant.ru/doc.aspx?DocsID=1301734&NodesID=4.)

Chernovalov, Aleksandr, 2008, Gorno-metallurgicheskij kompleks [Mining-metallurgy complex]: Kommersant Ukraina, November 10. (Accessed January 13, 2011, at http://www.kommersant.ua/doc.html?DocID=1054717.)

Coal Industry Workers' Union of Ukraine, 2011, O profsojuze [About the union]: Coal Industry Workers' Union of Ukraine. (Accessed February 3, 2011, at http://www.prupu.org/about/.)

Corathers, L.A., 2010, Manganese: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 98-99.

Donbass Fuel and Energy Co., 2010, Annual report 2009: Donetsk and Kiev, Ukraine, Donbass Fuel and Energy Co., April, 136 p.

Fenton, M.D., 2010 Iron and steel: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 80-81.

Gambogi, Joseph, 2010, Titanium mineral concentrates: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 172-173.

Ignatenko, Ippolit, 2009, NZF: Kolomojskij zagnal Pinchuka v paket [Kolomoyskyi corralled Pinchuk's holding]: UGMK.info, September 3. (Accessed January 13, 2011, at http://ugmk.info/art/nzf-kolomojskij-zagnal-pinchuka-v-paket/0.html.)

Interfax Ltd., 2008, Putin, Tymoshenko agree gas cooperation memorandum: Interfax Russia & CIS Oil and Gas Weekly, v. 854, no. 38, October 2-8.

Jaskula, B.W., 2010, Gallium: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 58-59.

Jorgenson, J.D., 2010, Iron ore: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 78-79.

JSC Naftogaz of Ukraine, 2009, NJSC Naftogaz of Ukraine demand to stop manipulation concerning calculations for natural gas: JSC Naftogaz of Ukraine press release, January 3. (Accessed January 3, 2011, at http://www.naftogaz.com/www/2/nakweben.nsf/0/B74526AB6838619EC2257533005EEB13?OpenDocument&year=2009&month=01&nt=News&.)

JSC Naftogaz of Ukraine, 2010, Distribution and consumption: JSC Naftogaz of Ukraine. (Accessed December 30, 2010, at http://www.naftogaz.com/www/2/nakweben.nsf/0/BCCB6EF8E28D4250C225740900464ECB?OpenDocument&Expand=2.2.5&#.)

Digitized by Google

Karpenko, Georgij, 2009, Titan Ukrainy: Timoshenko zabyla o Firtashe [Titan Ukrainy: Timoshenko forgot about Firtash]: UGMK.info, November 11. (Accessed January 11, 2011, at http://www.ugmk.info/art/titan-ukrainy-timoshenko-zabyla-o-firtashe/0.html.)
Kommersant Ukraina, 2009a, Margantsennoe predlozhenie [Manganese proposal]: Kommersant Ukraina, November 27. (Accessed April 21, 2010, at http://www.kommersant.ru/doc.aspx?DocsID=1281546&print=true.)
Kommersant Ukraina, 2009b, Titan Ukrainy dozhil do sozdanija [Titan Ukrainy lived to creation]: Kommersant Ukraine, February 27. (Accessed January 7, 2011, at http://www.kommersant.ua/doc.html?DocID=1126761&IssueId=7000058.)
Metall Ukrainy [Metal of Ukraine], 2008, GMK—Problemy otrasli [The mining and metals complex—The problems of the industry]: Metall Ukrainy, no. 18, September 16-30, 70 p.
Metall Ukrainy [Metal of Ukraine], 2009a, Jeksport rudy [Ore exports]: Metall Ukrainy, no. 19, October 1-15, 70 p.
Metall Ukrainy [Metal of Ukraine], 2009b, Kabmin prodlil dejstvie memoranduma o vzaimoponimanii s metallurgami [The Cabinet extended the action of the memorandum of understanding with the metallurgy industry]: Metall Ukrainy, no. 23, December 1-15, 70 p.
Metall Ukrainy [Metal of Ukraine], 2009c, Kabmin sozdaet gosrezerv jenergeticheskovo uglja [The Cabinet of Ministers establishes a Government reserve of energy coal]: Metall Ukrainy, no. 6, March 16-31, 70 p.
Metall Ukrainy [Metal of Ukraine], 2009d, Konkurentsposobnost metalla zavisit ot memoranduma [The competitiveness of metal depends on the memorandum]: Metall Ukrainy, no. 13, July 1-15, 70 p.
Metall Ukrainy [Metal of Ukraine], 2009e, Marganetskij i Ordzhonikidzevskij GOKi vozobnovili proizvodstvennuju dejatelnost [The Marganets and Ordzhonikidze Mining and Beneficiation Complexes restarted production]: Metall Ukrainy, no. 7, April 1-15, 70 p.
Metall Ukrainy [Metal of Ukraine], 2009f, Rynok zhelezorudnogo syrja [The iron ore market]: Metall Ukrainy, no. 22, November 16-30, 70 p.
Metall Ukrainy [Metal of Ukraine], 2009g, Vostochnyj GOK nachal podgotovku k razrabotke Safonovskogo mestorozhdenija uranovykh rud [Vostochny GOK has begun preparations for the development of the Safonovskoye uranium ore deposit]: Metall Ukrainy, no. 15, August 1-15, 70 p.
Metall Ukrainy [Metal of Ukraine], 2010a, Jeksport titansoderzhashikh rud sokratilsja na 24% [Export of titanium ore reduced by 24%]: Metall Ukrainy, no. 4, February 15-28, 70 p.
Metall Ukrainy [Metal of Ukraine], 2010b, Rynok zhelezorudnogo syrja [The iron ore market]: Metall Ukrainy, no. 2, January 16-31, 70 p.
Metall Ukrainy [Metal of Ukraine], 2010c, Velikotokmakskoye mestorozhdenie margantsevykh rud [The Velikotokmakskoye manganese ore deposit]: Metall Ukrainy, no. 2, January 16-31, 70 p.
Metinvest B.V., 2007, Antimonopoly committee of Ukraine approved concentration of over 50% in ZAO Makeyevka Steel by Metinvest: Metinvest B.V. press release, December 20. (Accessed January 13, 2011, at http://www.metinvestholding.com/en/press-centre/news/2007/12/146.)
Metinvest B.V., 2010, Annual report 2009: Donetsk, Ukraine, Metinvest B.V., August, 64 p.
Neverov, Aleksandr, 2010, Pochemu Industrialnyj Sojuz Donbassa styditsja priznatsja, kto ego kupil? [Why is the Industrial Union of Donbass ashamed to admit who bought it?]: Ukrainian Independent Information Agency, January 14. (Accessed January 12, 2011, at http://www.unian.net/rus/news/news-356814.html.)
NNEGC Energoatom, 2010, Itogi za 2009 god [2009 results]: Energoatom. (Accessed September 28, 2010, at http://www.atom.gov.ua/ru/financial/res2009.htm.)
OAO Gazprom, 2009a, Alexey Miller's statement about gas price for Ukraine: OJSC Gazprom press release, January 1. (Accessed December 29, 2010, at http://www.gazprom.com/press/news/2009/january/article67876/.)
OAO Gazprom, 2009b, Gazprom has to stop deliveries to entry point of gas transmission system of Ukraine: OJSC Gazprom press release, January 7. (Accessed December 29, 2010, at http://www.gazprom.com/press/news/2009/january/article67853/.)
OAO Gazprom, 2009c, Russian gas deliveries toward Ukraine initiated: OJSC Gazprom press release, January 20. (Accessed December 29, 2010, at http://www.gazprom.com/press/news/2009/january/article67744/.)
Olson, D.W., 2010, Graphite: U.S. Geological Survey Mineral Commodity Summaries 2010, p. 68-69.
RBC Ukraine, 2009, Gazprom: Srednjaja cena gaza dlja Ukrainy v 2010 g. sostavit okolo 280 doll./tys. kub. M [Gazprom: The average price of gas for Ukraine in 2010 will be about $280 per thousand cubic meters]: RBC Ukraine, November 25. (Accessed January 18, 2011, at http://www.rbc.ua/rus/top/show/_gazprom_srednyaya_tsena_gaza_dlya_ukrainy_v_2010_g_sostavit_okolo_280_doll_tys_kub_m25112009.)
State Statistics Committee of Ukraine, 2009, Commodity pattern of foreign trade of Ukraine, 2008: State Statistics Committee of Ukraine, June 24. (Accessed December 27, 2010, at http://www.ukrstat.gov.ua/.)
State Statistics Committee of Ukraine, 2010a, Commodity pattern of foreign trade of Ukraine, 2009: State Statistics Committee of Ukraine, February 18. (Accessed February 23, 2010, at http://www.ukrstat.gov.ua/.)
State Statistics Committee of Ukraine, 2010b, Gross domestic product, 2008: State Statistics Committee of Ukraine, November 1. (Accessed December 27, 2010, at http://www.ukrstat.gov.ua/.)
State Statistics Committee of Ukraine, 2010c, Gross domestic product, 2009: State Statistics Committee of Ukraine, April 1. (Accessed October 26, 2010, at http://www.ukrstat.gov.ua/.)
State Statistics Committee of Ukraine, 2010d, Output of basic industrial products in 2009, by month: State Statistics Committee of Ukraine. (Accessed March 24, 2010, at http://www.ukrstat.gov.ua.)
State Statistics Committee of Ukraine, 2010e, Residential buildings put into service: State Statistics Committee of Ukraine, February 19. (Accessed December 28, 2010, at http://www.ukrstat.gov.ua/.)
State Statistics Committee of Ukraine, 2010f, The change of gross domestic product volume, 2009: State Statistics Committee of Ukraine, May 5. (Accessed October 26, 2010, at http://www.ukrstat.gov.ua/.)
Sterkin, Philip, Kravchenko, Ekaterina, Nikolsky, Alexei, and Khimshiashvili, Polina, 2010, Dengi i atom [Money and the atom]: Ukrrudprom, May 5. (Accessed January 6, 2011, at http://www.ukrrudprom.com/digest/Dengi_i_atom.html.)
System Capital Management, 2011, About SCM: System Capital Management. (Accessed January 12, 2011, at http://www.scm.com.ua/en/publish/category/7590.)
Ukrrudprom, 2008, Zaporozhskij oblsovet odobril memorandum s ISD [The Zaporizhia Oblast Administration approved a memorandum with ISD]: Ukrrudprom, December 23. (Accessed April 22, 2010, at http://www.ukrrudprom.ua/news/etyuet34578.html.)
Ukrrudprom, 2009, Julii Timoshenko zapretili prodavat shakhty [Yulia Tymoshenko was forbidden to sell mines]: Ukrrudrom, October 1. (Accessed January 14, 2011, at http://www.ukrrudprom.com/news/YUlii_Timoshenko_zapretili_prodavat_shahti.html.)
World Energy Council, 2010, 2010 survey of energy resources: World Energy Council, 608 p. (Accessed January 13, 2011, at http://www.worldenergy.org/documents/ser_2010_report.pdf.)
World Nuclear Association, 2010a, Nuclear power in Ukraine: World Nuclear Association, September. (Accessed September 27, 2010, at http://www.world-nuclear.org/info/inf46.html.)
World Nuclear Association, 2010b, World uranium mining: World Nuclear Association, May. (Accessed July 22, 2010, at http://www.world-nuclear.org/info/inf23.html?terms=production.)
World Steel Association, 2009, World steel in figures 2009: Brussels, Belgium, World Steel Association, 26 p.
World Steel Association, 2010, World steel in figures 2010: Brussels, Belgium, World Steel Association, 26 p.

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TABLE 1

UKRAINE: PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008	2009
METALS						
Alumina		1,632,020	1,671,620	1,700,000 e	1,673,000 r	1,524,000
Aluminum:						
Primary		114,224	112,961	113,437	113,000	50,000
Secondary[e]		130,000	130,000	130,000	130,000	130,000
Total[e]		244,000 r	243,000 r	243,000 r	243,000 r	180,000
Cadmium, metal[e]		25	25	25	25	25
Copper, metal, secondary[e]		20,000	20,000	20,000	20,000	20,000
Gallium[e]		13	13	13	13	13
Germanium[e]	kilograms	1,000 r	1,000 r	1,000 r	1,032 r, 3	690 3
Gold, mine output, Au content[e]	do.	180 r	120 r	-- r	-- r	--
Iron and steel:						
Iron ore, marketable ore and concentrate:						
Gross weight		68,569,600	74,000,000	77,900,000	72,688,000 r	66,476,000
Fe content[e]		37,700,000	40,700,000	42,800,000	40,000,000	36,600,000
Metal:						
Pig iron		30,747,000	32,926,000	35,647,000	30,982,000	25,682,900
Ferroalloys:						
Blast furnace:[e]						
Ferromanganese		30,000	26,700	28,400	16,000 r	--
Spiegeleisen		5,000	4,450	4,730	2,000 r	--
Electric furnace:						
Ferromanganese		359,000	373,000	368,000	362,400	129,400
Ferronickel		61,166 r	79,338 r	79,530 r	89,825 r	61,449
Ferrosilicon		228,000	169,000	218,000	152,800	150,300
Silicomanganese		1,046,000	1,168,000	1,281,000	894,900	741,900
Other[e]		25,000	22,200	23,700	23,000	20,000
Total, blast and electric furnaces[e]		1,750,000 r	1,840,000 r	2,000,000 r	1,540,000 r	1,100,000
Steel:						
Crude		38,541,000 r	40,891,000 r	42,830,000	37,279,000 r	29,855,000
Finished products:						
Rolled		22,180,000	22,387,000	24,510,000	20,493,000	16,097,600
Pipe		2,293,000	2,759,000	2,811,000	2,542,000	1,742,000
Lead, refined, secondary[e]		7,000 r	7,000 r	7,000 r	7,000 r	8,000
Magnesium metal[e, 4]		2,000	2,200	2,500	2,000	2,000
Manganese, marketable ore and concentrate:						
Gross weight		2,260,000	1,606,400	1,719,600	1,446,600	932,000
Mn content[e]		770,000	546,000	580,000	492,000	316,000
Nickel:						
Mine output, Ni content of laterite ore[e]		6,000	12,000	12,000	8,000	--
Ni content of ferronickel		12,074 r	15,223 r	14,211 r	16,224 r	12,392
Titanium:						
Ilmenite concentrate:[e, 5]						
Gross weight		375,000	470,000	500,000	520,000	500,000
TiO_2 content, 59%		222,000	276,000	294,000	306,000	295,000
Rutile concentrate, 95% TiO_2[e]		60,000	60,000	60,000	60,000	60,000
Metal, sponge		8,397	9,100 r	9,742 r	9,930	7,000 e
Zirconium concentrates[e]		35,000	35,000	35,000	35,000	35,000
INDUSTRIAL MINERALS						
Bromine		6,118 r	5,150 r	7,824 r	4,416 r	4,121
Cement		12,183,000	13,732,000	15,000,000	14,918,400 r	9,495,700
Clays:						
Ball clay		118,000	294,000	652,000	650,000 e	600,000 e
Bentonite[e]		300,000	300,000	300,000	200,000	195,000
Kaolin	thousand metric tons	1,566 r	1,731 r	2,172 r	1,775 r	1,119

See footnotes at end of table.

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TABLE 1—Continued

UKRAINE: PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008	2009
INDUSTRIAL MINERALS—Continued						
Diamond, synthetic[e]	carats	8,000,000	8,000,000	8,000,000	8,000,000	8,000,000
Feldspar		63,930	67,313	76,305	83,420	84,757
Graphite[e]		10,400	5,800	5,800	5,800	5,500
Gypsum		380,600	375,900	741,580	1,158,000	711,000
Lime	thousand metric tons	5,342	5,450	5,688	5,128	4,101
Limestone	do.	25,100	27,800	30,000	26,700	18,000
Nitrogen, N content of ammonia[e]	do.	4,300	4,200	4,200	4,000 r	2,500
Potash, K_2O equivalent[e]		13,100	8,100	11,900	12,000	12,000
Salt		4,811,000	5,996,000	5,548,000	4,425,000	5,395,000
Soda ash[e]		900,000 r	700,000	700,000	700,000	600,000
Sulfur, native[e]		139,000	133,000	135,000	135,000	120,000
Sulfuric acid	thousand metric tons	1,606 r	1,493	1,657 r	1,479 r	890
Vermiculite[e]		64,000	65,000	65,000	65,000	55,000
MINERAL FUELS AND RELATED MATERIALS						
Coal, raw:						
Anthracite[e]	thousand metric tons	16,204 [3]	13,444 [3]	13,000	14,000	13,000
Bituminous	do.	58,000	66,600	62,255	63,400 e	59,000 e
Lignite	do.	355	231	182	200 e	200 e
Total	do.	74,559	80,275	75,400 e	77,600 e	72,200 e
Marketable	do.	60,400	61,439	58,739	59,312 r	54,820
Coke		21,999,000	19,200,000	20,143,000	19,543,000 r	17,424,000
Natural gas	thousand cubic meters	20,788,000	21,094,000	21,104,000	20,713,000 r	21,444,000
Peat, horticultural use and fuel use		639,000	462,000	395,000	358,000	449,000
Petroleum:[e]						
Crude and gas condensate[6]	42-gallon barrels	32,100,000	32,800,000	32,400,000	30,300,000 r	28,500,000
Refinery products[7]	do.	131,000,000 r	104,000,000 r	103,000,000 r	83,700,000 r	85,700,000
Uranium:[e]						
U content		800 r	800 r	800 r	830 r	830
U_3O_8 content		940 r	940 r	940 r	980 r	980

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. do. Ditto. -- Zero.

[1]Table includes data available through January 18, 2011.

[2]In addition to the commodities listed, other minerals may be produced, but available information was inadequate to make reliable estimates of output.

[3]Reported figure.

[4]Includes secondary

[5]Ilmenite production statistics include information from production at only the Irshansk GOK and Volnogorsk State Mining-Metals Complex. Production data for OOO Valki-Ilmenit were not available, but it may produce an additional 50,000 metric tons per year of ilmenite concentrate.

[6]Figures were converted to barrels from metric tons (t), which were reported as follows: 2005—4,414,000 t; 2006—4,506,000 t; 2007—4,459,000 t; 2008—4,168,300 t; 2009—3,916,600 t.

[7]Figures were converted to barrels from metric tons, which were reported as follows: 2005—17,189,000 t; 2006—13,525,000 t; 2007—13,283,000 t; 2008—10,717,000 t; 2009—10,959,000 t.

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TABLE 2

UKRAINE: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners[2]	Location or deposit names	Annual capacity[e]
Alumina and aluminum:			
Alumina	Nikolaev alumina refinery (United Company RUSAL)	20 kilometers south of Mykolaiv	1,500,000
Do.	Zaporozhye refinery (United Company RUSAL)	Zaporizhia	260,000
Aluminum, primary	Zaporozhye smelter (United Company RUSAL)	do.	114,000
Coal	About 165 active surface and underground mines, including:	About 95% of coal produced in Donetsk, Dnipropetrovsk, and Luhansk Oblasts	90,300,000 [3]
	Donbass Fuel and Energy Co. (DTEK) (System Capital Management, 100%):		
	OAO Pavlogradugol	10 mines in Dnipropetrovsk and Donetsk Oblasts	
	OAO Komsomolets Donbassa Mine	Kirovskoe, Donetsk Oblast	
	State Enterprise Sverdlovskanthracite	5 coal mines and 3 processing plants in Luhansk Oblast	
	State Enterprise Rovenkianthracite	6 mines and 3 processing plants in Luhansk Oblast	
	Krasnoarmeiskaya-Zapadnaya No. 1	1 mine at Krasnoarmeisk, Donetsk Oblast	
	JSC Krasnodon Coal Company (Metinvest B.V.)	7 mines and 2 processing plants in Luhansk Oblast	
	Approximately 28 smaller producers	Donetsk, Dnipropetrovsk, Luhansk, Lviv, and Volynsk Oblasts	
Coke	Evraz Group:	Dnipropetrovsk Oblast:	3,520,000
	OAO Dneprkoks coke plant	Dnipropetrovsk	
	OAO Bagleykoks coke plant	Dniprodzerzhinsk	
	OAO Dneprodzerzhinsk coke plant	Dniprodzerzhinsk	
Do.	Metinvest B.V.:		
	JSC Avdiivka Coke Plant	Avdeyevka, Donetsk Oblast	4,000,000
Do.	JSC Azovstal Iron and Steel Works	Mariupol, Donetsk Oblast	3,182,000
Do.	OJSC ArcelorMittal Kryviy Rih	Kryviy Rih, Dnipropetrovsk Oblast	3,304,000
Do.	OAO Donetsk coke plant	Donetsk, Donetsk Oblast	492,000
Do.	Yenakievo coke plant	Yenakievo, Donetsk Oblast	NA
Do.	OAO Zaporozhkoks	Zaporizhia	NA
Do.	Makeevka coke plant	Makeevka, Donetsk Oblast	NA
Do.	OAO Yasinovskiy Coke Plant	do.	NA
Do.	OAO Alchevsk Coking Plant [Industrial Union of Donbass (ISD Corp.)]	Alchevsk, Luhansk Oblast	3,600,000
Do.	Horlivka coke plant	Horlivka, Donetsk Oblast	440,000
Do.	Kharkov coke plant	Kharkov	225,000
Ferroalloys:			
Ferromanganese	Zaporozhye ferroalloys plant (PrivatBank Group)	Zaporizhia	100,000
Do.	Nikopol ferroalloys plant (PrivatBank Group)	Nikopol	300,000
Do.	Stakhanov ferroalloys plant (PrivatBank Group)	Luhansk Oblast	NA
Ferromanganese, blast furnace	Konstantinovka Iron and Steel Works	Konstyantynivka, Donetsk Oblast	NA [4]
Do.	Kramatorskiy Metal Plant "Kuibiysheva"	Kramatorsk, Donetsk Oblast	NA [5]
Ferronickel	Pobuzhskiy Ferronickel Plant	Pobuzhke, Kirovohrad Oblast	100,000
Ferrosilicon	Stakhanov ferroalloys plant (PrivatBank Group)	Luhansk Oblast	NA
Do.	Zaporozhye ferroalloys plant (PrivatBank Group)	Zaporizhia	100,000
Silicomanganese	Stakhanov ferroalloys plant (PrivatBank Group)	Luhansk Oblast	NA
Do.	Zaporozhye ferroalloys plant (PrivatBank Group)	Zaporizhia	250,000
Do.	Nikopol ferroalloys plant (PrivatBank Group)	Nikopol	900,000

See footnotes at end of table.

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TABLE 2—Continued

UKRAINE: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

(Metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners[2]	Location or deposit names	Annual capacity[e]
Gallium		Nikolaev alumina refinery (United Company RUSAL)	20 kilometers south of Mykolaiv	13
Germanium		Zaporozhye titanium-magnesium plant	Zaporizhia	19,000
Graphite		Zavalyevskiy graphite complex	Zavalyevskiy deposit	NA
Iron ore:				
Underground mining		Krivorozhskiy Iron Ore Complex (Metinvest B.V., 50%, and PrivatBank Group, 50%)	4 mines in Kryvorizkiy Iron Ore Basin	6,000,000
Do.		Sukha Balka (Evraz Group)	2 mines in Dnipropetrovsk Oblast	3,750,000
Do.		OJSC ArcelorMittal Kryviy Rih	2 mines at Kryviy Rih	1,500,000
Do.		Zaporozhye Iron Ore Complex	Eksplutatsionnay Mine in Zaporizhia Oblast	4,500,000
Do.		JSC Central Iron Ore Enrichment Works[6] (Metinvest B.V.)	1 mine in Dnipropetrovsk Oblast	2,200,000
Open pit mining		do.	3 mines in Dnipropetrovsk Oblast	12,000,000
Do.		JSC Northern Iron Ore Enrichment Works[7] (Metinvest B.V.)	2 mines in Dnipropetrovsk Oblast	30,000,000
Do.		JSC Ingulets Iron Ore Enrichment Works[8] (Metinvest B.V.)	Ingulets mine south of Kryviy Rih	35,000,000
Do.		Yuzhniy GOK (Evraz Holding, 50%, and Smart Holding, 50%)	Mine at Kryviy Rih	22,000,000
Do.		OJSC ArcelorMittal Kryviy Rih	2 mines at Kryviy Rih	24,200,000
Do.		Poltava GOK (Ferrexpo Plc.)	Gorishne-Plavninskoye and Lavrikovskoye (GPL) Mine, 15 kilometers east of Kremenchug	28,500,000
Lead, secondary		CJSC Svinets	Kostyantynivka	20,000
Magnesium metal		Magnii concern	Kalush	22,000
Manganese:				
Ore, marketable		Ordzhonikidze GOK (PrivatBank Group)	Ordzhonikidze	NA
Do.		Marganets GOK (PrivatBank Group)	Marhanets	NA
Metal		Zaporozhye ferroalloys plant (PrivatBank Group)	Zaporizhia	40,000
Mercury		OOO Nikitrtyt	Horlivka, Donetsk Oblast	300
Nickel, Ni content in FeNi		Pobuzhskiy GOK, comprising three open pit mines and the Pobuzhskiy Ferronickel Plant	Pobuzhke, Kirovohrad Oblast	20,000
Petroleum, refined	42-gallon barrels	Kherson oil refining plant[9]	Kherson	NA
Do.	do.	Odessa refinery (OAO Lukoil)	Odessa	23,000,000
Do.	do.	Lisichansk refinery (TNK-BP)	Lisichansk	52,560,000
Do.	do.	Halychyna refinery (Ukraine Oil Co.)	Drohobych, Lviv Oblast	28,600,000
Do.	do.	Kremenchug refinery (CJSC Ukrtatnafta)	Kremenchug	131,000,000
Do.	do.	JSC Naftokhimik Prykarpattya	Nadvirna, Ivano-Frankivsk Oblast	18,400,000
Potash, K_2O equivalent		Khlorvinil production association, Stebnik plant	Pricarpathian Region	NA
Steel, crude		Industrial Union of Donbass Corp. (ISD Corp.):		
		OJSC Alchevsk Iron and Steel Works	Alchevsk, Lugansk Oblast	NA
Do.		Dneprovskiy Metallurgical Plant "Dzerzhinsky"	Dniprodzerzhinsk	3,850,000
Do.		Metinvest B.V.:		
		JSC Azovstal Iron and Steel Works	Mariupol, Donetsk Oblast	6,200,000
Do.		JSC Yenakievo Iron and Steel Works	Yenakievo, Donetsk Oblast	2,700,000
Do.		OJSC ArcelorMittal Kryviy Rih	Kryviy Rih, Dnipropetrovsk Oblast	7,400,000
Do.		Dnepropetrovsk Metal Plant "Petrovskovo" (DMZP) (Evraz Group S.A., 96%)	Dnipropetrovsk	1,230,000
Do.		OJSC Ilyich Iron and Steel Works of Mariupol	Mariupol	7,300,000
Do.		JSC Zaporizhstal	Zaporizhia	4,350,000
Do.		Kramatorskiy Metal Plant "Kuibiysheva"	Kramatorsk, Donetsk Oblast	NA
Do.		Donetskstal	Donetsk	1,150,000

See footnotes at end of table.

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TABLE 2—Continued

UKRAINE: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

(Metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners[2]	Location or deposit names	Annual capacity[e]
Steel, crude—Continued		Donetsk Electrometallurgical Plant (formerly ISTIL minimill)	do.	1,000,000
Do.		Dneprospetsstal	Zaporizhia	1,400,000
Do.		OOO Elektrostal	Kurakhovo, Donetsk Oblast	300,000
Do.		JSC Energomashspetsstal	Kramatorsk, Donetsk Oblast	NA
Titanium:				
Concentrate:				
Ilmenite		Irshansk GOK [Leased from the Government by Crimea Titan CJSC (Government, 50% plus one share, and OstChem Gmbh, 50% minus one share)]	Irshansk, 50 kilometers north of Zhytomr	400
Do.		OOO Valki-Ilmenit	do.	70
Do.		Volnogorsk state mining-metals complex [Leased from the Government by Crimea Titan CJSC (Government, 50% plus one share, and OstChem Gmbh, 50% minus one share)]	Volnogorsk, 70 kilometers west of Dnipropetrovsk	200
Rutile		do.	do.	65
Sponge		Zaporozhye titanium-magnesium plant	Zaporizhia	20,000
Uranium:				
Ore	thousand metric tons	Vostochny GOK (Government)	Ingulskaya Mine at Kirovohrad	450
Do.	do.	do.	Smolinskaya Mine at Smolino	600
Concentrate		do.	Hydrometallurgical concentration plant at Zheltye Vody	1,000
Zinc, secondary		Ukrzinc plant	Kostyantynivka	25,000
Zirconium:				
Concentrate		Volnogorsk state mining-metals complex [Leased from the Government by Crimea Titan CJSC (Government, 50% plus one share, and OstChem Gmbh, 50% minus one share)]	Volnogorsk, 70 kilometers west of Dnipropetrovsk	35
Metal and compounds		State Research and Production Enterprise "Zirconium"	Dniprodzerzhinsk	NA

[e]Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

[1]Inconsistencies in enterprise and location names may exist because both Ukrainian or Russian spellings were used for transliterations. English versions of company names are used as given by official company sources (Web sites, press releases, and so forth). Ukrainian versions of location names are used wherever possible.

[2]GOK is the abbreviation for gorna-obogotitelniy kombinat, which translates as 'mining and beneficiation complex'.

[3]Capacity estimates are totals for all enterprises that produce that commodity.

[4]Konstantinovka Iron and Steel Works stopped production of blast furnace ferromanganese in 2008.

[5]Kramatorskiy Metal Plant "Kuibiysheva" stopped production of blast furnace ferromanganese in 2006.

[6]Identified as the Centralniy GOK in USGS Minerals Yearbook 2008.

[7]Identified as the Severniy GOK in USGS Minerals Yearbook 2008.

[8]Identified as the Inguletsky GOK in USGS Minerals Yearbook 2008.

[9]Identified as the Alliance Oil Co. in the 2008 Minerals Yearbook. Ownership of the Kherson Oil Refining Plant was not entirely clear, but it was reported that the Alliance Oil Co. sold its shares in the plant in 2007.

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THE MINERAL INDUSTRY OF THE UNITED KINGDOM

By Alberto Alexander Perez

In 2009, the United Kingdom's economy was ranked second after Germany's within the European Union (EU) in terms of the gross domestic product (GDP) based on purchasing power parity. The United Kingdom's GDP in 2009 dollars was $2.12 trillion, which was a 5% decrease compared with that of 2008. The country's heavy industry, which was composed of companies that produced automotive and aviation products, chemicals, and machine tools, among others, relied heavily on imported metal ores and concentrates, as well as on some industrial minerals and mineral fuels. The mineral fuels sector, which included coal, natural gas, and petroleum, formed a significant segment of the United Kingdom's mineral industry. As of 2008 (the latest year for which data were available), the country accounted for about 2.4% of the world's refined nickel production, 2.2% of the world's crude salt output, about 1.2% of the world's potash production, and about 1% of the world's output of aluminum and crude steel. The total output of the United Kingdom's manufacturing industry decreased by 10.5% compared with that of 2008, and the total output of its mining and quarrying sector decreased by 8.6% compared with that of 2008. The output of base metal and metal products decreased by 18.7% and that of nonmetallic mineral products decreased by 13.4% compared with 2008 levels of production. These decreases reflect the effect of the global economic slowdown in the United Kingdom, which was a major regional processor of raw mineral materials and a manufacturer and producer of consumer durables, which are very sensitive to decreases in demand (Bray, 2010, p. 5.18; Fenton, 2010, p. 37.16; Jasinski, 2010, p. 58.9; Office for National Statistics, 2010, p. 49-54; U.S. Central Intelligence Agency, 2010).

Minerals in the National Economy

Private sector investment in mining and quarrying in the United Kingdom remained at a similar level to that of 2008 at about $8.02 billion,[1] and private sector investment in metal and metal goods manufacturing decreased by 29.1%. Inventories in the mining and quarrying sector had a net decrease of $90.1 million compared with those of 2008, and metal and basic metal goods accounted for 11% of the sector's production. The investment in the metals and basic metal goods sector amounted to $1.22 billion, which was a 32% decrease compared with the investment in 2008. The production volume in the energy sector (oil, gas, and coal industries) decreased by 6.9% compared with that of 2008, and the slow economic recovery worldwide continued to affect the demand for mineral products significantly.

The United Kingdom's mineral sector not only served domestic economic needs but its mining and processing companies continued to play an important role in global mineral prospecting, mineral development, and mineral commodity trade. The London Metal Exchange remained the world's leading market for nonferrous metals.

Consumption of copper in 2008 (the latest year for which data were available) had increased by about 3% compared with consumption in 2007; however, consumption was still down by 83.3% from 2004 levels. Aluminum consumption had decreased by 3.8% but was down by 20.3% from 2004 levels, which reflected the diminishing consumption trends seen in other highly industrialized countries (British Geological Survey, 2010b, p. 22, 39; Office for National Statistics, 2010, p. 14-21).

Government Policies and Programs

The 1971 Minerals Act, as amended, is the statute that governs the development and exploitation of mineral deposits. Minerals, as defined in Section 209 of the Act, include all minerals and materials in or under the land of a kind ordinarily worked for removal by underground or surface workings; they do not, however, include peat cut for purposes other than for sale. Mineral development is specifically addressed in the Town and Country Planning (Minerals) Regulations, 1971 and the Town and Country Planning (Minerals) Act, 1981. Mineral rights to mineral fuels, such as coal, petroleum, and uranium, belong to the state. The Coal Authority is authorized to license open pit and underground mines to the private sector subject to restrictions on their size and the payment of a royalty on the amount of coal produced (British Geological Survey, 2010a).

Most other mineral rights in England, Scotland, and Wales are privately owned with the exceptions of gold and silver, which are vested in the Royal Family. A different situation regarding mineral rights applies for Northern Ireland where, under the Mineral Development Act (Northern Ireland), 1969, the rights to work minerals and to license others to do so are vested in the state. Although the Government had ratified the Kyoto Protocol, the EU decided to meet Kyoto requirements as a whole rather than as individual signatories, with each member state given a different emissions target by the EU (British Geological Survey, 2010a).

Production

The production of most minerals decreased in 2009 compared with their output levels in 2008. Production decreases were posted for the second year in a row for crude steel, which decreased by 25.3%; pig iron, by 24.3%; and primary aluminum, by 22.3% compared with their 2008 levels of production. These decreases in production were a consequence of the idling of plants and production reductions owing to the world economic slowdown and resulting weak demand. In the industrial minerals sector, barite production decreased by 16.2% whereas cement production remained stable. In 2009, the United Kingdom's total production of aluminum increased by almost 2% owing to

[1]Where necessary, values have been converted from the British pound sterling (£) to U.S. dollars (US$) at the average rate of £0.6548=US$1.00 and from euro area euros (€) to U.S. dollars (US$) at the average rate of €0.7201=US$1.00 for 2009.

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an increase of 40.5% in the production of secondary aluminum, whereas the production levels for coal and coke remained at about the same level of production as in 2008. Natural gas production decreased by 8.1% and crude petroleum production decreased by 4.6%, which continued the trend of decreasing production since at least the past 5 years (table 1).

Structure of the Mineral Industry

Domestic and foreign owned corporations produced minerals and mineral-based commodities. Table 2 is a list of major mineral industry facilities.

Mineral Trade

The United Kingdom was a net exporter of iron and steel and a net importer of coal, natural gas, crude petroleum, and petroleum products in 2009. It exported metals and metal manufactures for a total value of $6.51 billion, which was a decrease of 15.6% compared with the export value in the previous year. The value of the country's exported petroleum and petroleum products was $37.7 billion, which was a decrease of 23.4% compared with that of the previous year. The values of the country's iron and steel and nonferrous metals exports were $7 billion and $6.06 billion, respectively, which were large decreases compared with the values of those exports in 2008. The United Kingdom became a net importer of natural gas in 2004, of crude petroleum in 2005, and of refined petroleum products in 2006 after many years of self-sufficiency (Office for National Statistics, 2010, p. 96-97).

Commodity Review

Metals

Aluminum.—Rio Tinto Alcan Ltd.'s smelter at Lynemouth continued to produce under capacity owing to the high prices of electricity and weak demand. The smelter had reduced production in November 2008 when the Anglesey smelter ceased operations in the second quarter of 2009. The company's Lochaber and Lynenmouth smelters were the only two primary aluminum smelters remaining in the United Kingdom (Rio Tinto Ltd., 2010, p. 26).

In August, Tandom Metallurgical Group took over the secondary aluminum operations in Congleton, Cheshire, which had previously been owned by F.E. Mottram Ltd. The facility was one of the largest secondary aluminum producers, by volume, in the United Kingdom and had been in voluntary administration since June 2009. The company announced that the site would run as a trading operation dealing in scrap and secondary aluminum ingot. The aluminum alloy production, however, would not resume until the economic climate improved (Metal Bulletin, 2010).

Gold.—The number of licenses for exploration and development of gold mines in Great Britain decreased in 2009 from 32 to 24 because eight licenses were relinquished in Northern Ireland. The number of leases remained constant at four. Exploration continued at Cononish in Perthshire and in Omagh and Armagh in Northern Ireland. In Scotland, Scotgold Resources plc had licenses from mines royal for the areas around Glen Lyon, Glen Orchy, and Inverliever and owned the gold and silver assets of the Cononish deposit near Tyndrum.

In Northern Ireland, the Omagh (formerly Cavanacaw) deposit located 10 kilometers (km) southwest of Omagh was owned by Omagh Minerals Ltd., which was a wholly owned subsidiary of Galantas Gold Corp. The deposit has a proven and probable reserve of 367,310 metric tons grading 7.52 grams per metric ton gold across a width of 4.43 meters (m) within the designated open pit area. Galantas had been granted exploration licenses to the west and north of its existing license and now held licenses for an area totaling 460 square kilometers.

Conroy Diamonds and Gold plc was exploring in the Clontibret district. The district is located on the border of Northern Ireland and the Republic of Ireland near Monahan (British Geological Survey, 2010b, p. 49-50).

Nickel.—Alba Mineral Resources plc relinquished its four exploration licenses in the Aberfeldy area. This area covers Arthrath, Kilmelford, and part of the Ochil Hills (British Geological Survey, 2010b, p. 73).

Industrial Minerals

The United Kingdom remained an important producer of such minerals as barite, calcareous material for cement, clays, and fluorspar.

Barite.—The United Kingdom's barite production had been declining since 2005. Production was dominated by M-I Drilling Fluids (UK) Ltd., which operated the underground Foss Mine near Aberfeldy in Perthshire, Scotland. The production of this mine accounted for 93% of the total production in 2009; the remainder of the United Kingdom's production of barite was confined to the Southern Pennine Orefield where barites were derived as a byproduct of fluorspar mining (British Geological Survey, 2010b, p. 25).

Cement.—Cemex S.A.B. de C.V. of Mexico opened a new cement grinding and blending plant in Tilbury, Essex. The plant was the largest cement industry investment of the past 5 years in the United Kingdom. The plant was the only operational cement plant in the southeast of England, and was capable of producing standard CEM1 (consisting of cement clinker and gypsum), CEM2 (70% CEM1 and 30% fly ash), and CEM3 (50% CEM1 and 50% ground granulated blast-furnace slag) (Worldcement.com, 2009a, p. 10).

Cenin Ltd. (Cenin), which was located in Wales, had developed a technology to produce ultra-low-carbon cement from industrial byproducts. The technology produces less than 250 kilograms (kg) of CO_2 per metric ton of cement produced, and the company intended to reduce this further to 30 kg. Cenin began supplying cement to several blue chip companies in July, and it planned to install a second mill in the near future to meet demand (Worldcement.com, 2009b, p. 14).

During 2009, HansonCement Ltd. announced a decrease in production and 93 layoffs at its Padeswood cement plant in Flintshire. The company cited decrease in demand for cement and difficult market conditions as the reason for the layoffs (British Geological Survey, 2010b, p. 29).

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Fluorspar.—Glebe Mines Ltd. was the United Kingdom's only domestic producer of fluorspar (calcium fluorite) and it supplied the country's two fluorochemical producers with acid-grade fluorspar. Glebe's operations were based on surface extraction and processing in the Southern Pennine Orefield. Glebe operated the Cavendish Mill near Stoney Middleton to produce acid-grade fluorspar, together with byproduct barite and lead concentrate. In October 2009, Glebe Mines' ore reserves were estimated to be about 1.2 million metric tons. In 2009, Glebe Mines was fined more than $61,000 for the damage caused by the failure of one of the mine's tailings dams in 2007, which resulted in flooding and waste discharge into surrounding areas and the nearby village of Stoney Middleton (British Geological Survey, 2010b, p. 48).

Iron and Steel.—Tata Steel Europe (formerly the Corus Group) announced in July that it was laying off 4,000 workers and mothballing two furnaces owing to decreased demand. Furthermore, the Teeside cast products works, which was also owned by Tata Steel Europe, was slated to close in February 2010, and an additional 1,600 workers would be laid off. Pig iron and steel production decreased in the United Kingdom by 24% and 25%, respectively, compared with production in 2008 (Financial Times, The, 2009).

Mineral Fuels

Coal.—Coal production in the United Kingdom increased slightly in 2009, making it 2 years in a row that a rise in production had been achieved against the long-term trend of production decreases. Coal Authority licenses for opencast sites in production by December 31 totaled 35 and included 19 in Scotland, 9 in England, and 7 in Wales. Scottish Coal Co. Ltd. was the leading opencast coal mining company in the United Kingdom and the second leading net coal producer (British Geological Survey, 2010b, p. 33).

Coal consumption decreased by 7.2% in 2008 (the latest year for which these data were available) compared with that of 2007. The generation of electricity accounted for 82.1% of the country's total coal consumption. Thirty-two percent of all electricity generated in the United Kingdom was supplied by coal in 2008 (British Geological Survey, 2010b, p. 33).

Natural Gas and Petroleum.—In August 2009, Abu Dhabi National Energy Co.'s (Taqa) subsidiary Taqa Bratani of the United Arab Emirates took over the operation of the Brent pipeline system in the North Sea. This pipeline transported 8% of the United Kingdom's offshore crude petroleum production. Taqa replaced the Shell Group, which had been the pipeline's operator since 1975 (MEED, 2009).

In September, 2009 Total E&P UK entered into agreements with Anadarko North Sea Holding Company Ltd., Marathon Oil UK Ltd., and Mobil North Sea LLC to acquire a 43.75% stake in the United Kingdom's license no. P967, which includes the Tobermory discovery. Total E&P UK would become the operator of the license. The Tobermory gas reservoir was discovered in 1999. It is located in 1,600 m of water and situated 175 km northwest of the Shetland Isles (Total S.A., 2010, p. 3).

Maersk Oil UK Ltd. (Maersk) announced in August that it had produced first oil from its Affleck development in the United Kingdom's sector of the North Sea. The field lies within Block 30/19a and it was operated by Maersk Oil and its partner, Talisman North Sea Ltd. The crude petroleum was exported through the existing Janice pipeline into Norpipe, and then to Teeside. Gas was routed through existing ties on the Janice and the Judy export pipelines onto the St. Fergus Terminal in Aberdeenshire, Scotland (Maersk Oil UK Ltd., 2009).

In July, Oil and Gas UK published its 2009 annual economic report, which stated that even if 20% of the United Kingdom's energy budget is met by renewable sources by 2020, 70% would still have to come from oil and gas, and only 40% of this would come from the United Kingdom Continental Shelf (UKCS). The industry provided direct or indirect employment for 450,000 people and paid $19.2 billion in corporate taxes to the United Kingdom's treasury in the 2008-09 financial year. The expenditures of the industry in exploration, development, and operations during the past 40 years was estimated to exceed $633 billion; therefore, the industry was considered essential to the United Kingdom's economy (British Geological Survey, 2010b, p. 74).

The Buzzard oilfield in the outer Moray Firth was again the most prolific oilfield on the UKCS. The North Sea holds Europe's largest natural gas and petroleum reserves. At the end of 2009, the United Kingdom's estimated proven crude oil reserves totaled 3.6 billion barrels, which was the largest within the EU; the reserves were located mostly offshore on the UKCS. Most of the country's production had come from basins east of Scotland in the central North Sea. The northern North Sea, east of the Shetland Islands, also contains considerable reserves, and smaller deposits are located in the North Atlantic Ocean. Besides these offshore assets, the country had the Wytch Farm field, which was the largest onshore oilfield in Europe (British Geological Survey, 2010b, p. 75; U.S. Energy Information Administration, 2010).

Outlook

The United Kingdom is likely to continue to be a leading European producer of crude oil and refined products. Onshore exploration activities will probably be directed mainly toward gold and mixed sulfide ores, particularly in Northern Ireland. Offshore natural gas and petroleum exploration and site development are expected to continue to be focused in the North Sea, particularly in the areas west of the Shetland Islands, the central North Sea, and the Southern Gas Basin of the North Sea. The steel industry's recovery will depend of the international prices and the reactivation of the existing plants. Aluminum production will likely remain flat owing to the relationship between prices and the relative high cost of electricity for its production.

References Cited

Bray, E.L., 2010, Aluminum, *in* Metals and minerals: U.S. Geological Survey Minerals Yearbook 2008, v. I, p. 5.1-5.19. (Accessed November 15, 2010, at http://minerals.usgs.gov/minerals/pubs/commodity/aluminum/myb1-2008-alumi.pdf.)

British Geological Survey, 2010a, Minerals UK, Legislation and policy: British Geological Survey, London, United Kingdom, British Geological Survey. (Accessed November 10, 2009, at http://www.bgs.ac.uk/mineralsuk/planning/legislation/home.html.)

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British Geological Survey, 2010b, United Kingdom minerals yearbook 2009: Keyworth, Nottingham, United Kingdom, British Geological Survey, 108 p.
Fenton, M.D., 2010, Iron and steel, *in* Metals and minerals: U.S. Geological Survey Minerals Yearbook 2008, v. I, p. 37.1-37.17. (Accessed November 15, 2010, at http://minerals.usgs.gov/minerals/pubs/commodity/iron_&_steel/myb1-2008-feste.pdf.)
Financial Times, The, 2009, Cuts threaten to cast steel industry into oblivion: The Financial Times [London, United Kingdom], July 16. (Accessed December 17, 2010, at http://www.ft.com/cms/s/0/cf8fd5c8-71a1-11de-a821-00144feabdc0.html#axzz1AqsTBTd1.)
Jasinski, S.M., 2010, Potash, *in* Metals and minerals: U.S. Geological Survey Minerals Yearbook 2008, v. 1, p. 58.1-58.9. (Accessed November 15, 2010, at http://minerals.usgs.gov/minerals/pubs/commodity/potash/myb1-2008-potas.pdf.)
Maersk Oil UK Ltd., 2009, Maersk Oil produces first oil from Affleck field: Maersk Oil UK Ltd., August 17. (Accessed December 22, 2010, at http://www.maerskoil.com/Media/NewsAndPressReleases/Pages/MaerskOilproducesFirstOilfromAffleckField.aspx.)
MEED, 2009, Abu Dhabi takes over UK oil pipeline system: MEED, August 5. (Accessed December 1, 2010, at http://www.meed.com/sectors/markets/abu-dhabi-takes-over-uk-oil-pipeline-system/2039837.article.)
Metal Bulletin, 2010, Muir, Lumsden and Chinook set up jv to take over FE Mottram Congleton: Metal Bulletin. (Accessed October 12, 2010, at http://www.metalbulletin.com/Article/2280309/Scrap/Muir-Lumsden-and-Chinook-set-up-jv-to-take-over-FE-Mottram-Congleton-UPDATE.html.)
Office for National Statistics, 2010, Monthly digest of statistics: Office for National Statistics, no. 777, September, 139 p. (Accessed October 15, 2010, at http://www.statistics.gov.uk/downloads/theme_compendia/md-sep-10/md-sep-2010.pdf.)
Rio Tinto Ltd., 2010, Annual report 2009: Rio Tinto Ltd., 238 p. (Accessed December 7, 2010, at http://www.riotinto.com/documents/Investors/Rio_Tinto_annual_report_2009.pdf.)
Total S.A., 2010, Factbook 2009: Total S.A., 127 p. (Accessed December 12, 2010, at http://www.total.com/MEDIAS/MEDIAS_INFOS/3278/FR/Total-2009-factbook-global.pdf?PHPSESSID=baba3457b089e7ae240f2a0705c48ce6.)
U.S. Central Intelligence Agency, 2010, United Kingdom, *in* The world factbook: U.S. Central Intelligence Agency. (Accessed November 15, 2010, at https://www.cia.gov/library/publications/the-world-factbook/geos/uk.html.)
U.S. Energy Information Administration, 2010, United Kingdom: U.S. Energy Information Administration country analysis brief, May, 13 p. (Accessed October 12, 2010, at http://tonto.eia.doe.gov/country/country_energy_data.cfm?fips=UK.)
Worldcement.com, 2009a, Cemex Tilbury plant officially opens: Worldcement.com, November, v. 40, no. 11, p. 10.
Worldcement.com, 2009b, Green cement attracts interest: Worldcement.com, May, v. 40, no. 5, p. 14.

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TABLE 1

UNITED KINGDOM: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008	2009
METALS						
Aluminum, metal:						
Primary		368,477	360,300	364,600	326,000	253,000
Secondary		205,400 r	204,200 r	193,900	205,200 r	288,397
Total		573,877 r	564,500 r	558,500	531,200 r	541,397
Iron and steel:						
Iron ore and concentrate, manganiferous:						
Gross weight		354	350 e	300	100	--
Fe content, 54% Fe		195	195 e	162	54	--
Metal:						
Pig iron	thousand metric tons	10,189 r	10,696 r	10,960 r	10,137 r	7,671
Steel:						
Crude	do.	13,210	13,931	14,300	13,500	10,079
Hot-rolled	do.	10,299	10,757 r	10,170 r	9,517 r	7,091
Lead:						
Mine output, Pb content e		400 r	400 r	100 r	200 r	200
Metal:						
Smelter, bullion from imported concentrate		36,000	36,000 r	36,000 r	36,000 r	36,000
Refined:						
Primary[2]		161,350	174,700	119,000 r	139,000 r	135,000 e
Secondary[3]		143,000	144,000	144,000	144,000	144,000 e
Total		304,350	318,700	263,000 r	283,000 r	279,000 e
Nickel, metal[4]		37,600	36,800	34,100	38,000	38,000 e
INDUSTRIAL MINERALS						
Barite[5]		64,000 r	48,000 r	53,000	43,000	36,000 e
Cement, hydraulic	thousand metric tons	11,216	11,400	11,890	10,071	10,000 e
Clays:						
Fire clay e	do.	395	228	338 r,6	180 r	180
Kaolin, china clay[7]	do.	1,911	1,900 e	1,671	1,355	1,060 e
Ball clay and pottery clay e, 8	do.	1,011 6	1,000	1,022 6	1,020	727
Other, including shale	do.	10,898	10,432	10,104	8,459	8,000 e
Feldspar, china stone e		1,835 6	2,000	1,000	500 r	500
Fluorspar, all grades e, 9		60,980 6	50,000 r	45,000	37,000 r	19,000
Gypsum and anhydrite e	thousand metric tons	1,700	1,700	1,700	1,700	1,700
Lime, hydrated and quicklime e	do.	1,500	1,500	1,500	1,500	1,500
Nitrogen, N content of ammonia e	do.	1,080 6	1,100	1,100	1,100	1,100
Potash, KCL product		732,000	716,000	712,000	673,000	600,000
Salt: e						
Rock	thousand metric tons	2,000	2,000	2,000	2,000	2,000
From brine	do.	1,000	1,000	1,000	1,000	1,000
In brine, sold or used as such	do.	2,800	2,800	2,800	2,800	2,800
Sand and gravel, common sand and gravel	do.	94,666	92,107	93,236	85,473 r	65,800
Sodium compounds, carbonate, n.e.s. e, 10	do.	1,000	1,000	1,000	1,000	1,000
Stone:						
Chalk	do.	7,105	7,376	7,566	5,874 r	6,000 e
Dolomite	do.	11,514	12,101	7,622	5,509 r	5,000 e
Igneous rock	do.	53,104	53,954	58,909	53,489 r	40,100 e
Limestone	do.	77,596	80,228	83,491	74,143 r	54,700 e
Sandstone	do.	18,685	18,038	16,806	12,255	9,200 e
Slate, including fill	do.	928	865	1,428	1,058 r	1,100 e
Total	do.	168,932 r	172,562 r	175,822	152,328 r	116,000 e

See footnotes at end of table.

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TABLE 1—Continued

UNITED KINGDOM: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008	2009
INDUSTRIAL MINERALS—Continued						
Talc, soapstone, pyrophyllite		6,000	4,000	3,000	2,000	3,000
Titanium, titanium dioxide[e]	thousand metric tons	200	200	200	200	200
MINERAL FUELS AND RELATED MATERIALS						
Coal, anthracite and bituminous:	thousand metric tons	20,498	20,000 [e]	17,030	17,912	18,054
Coke:[e]						
Metallurgical	do.	4,105 [6]	4,000	4,000	4,000	4,000
Breeze, all types	do.	259 [6]	250	250	250	250
Gas, natural, marketable[11]	billion cubic meters	91 [r]	83 [r]	76 [r]	74 [r]	68 [e]
Peat[e]	cubic meters	1,505	1,593	885	760 [r]	800
Petroleum:						
Crude[12]	thousand 42-gallon barrels	660,285	597,140	597,870	507,850 [r]	484,643
Refinery products	do.	665,316 [r]	641,433 [r]	627,333 [r]	612,632 [r]	610,000 [e]

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. do. Ditto. -- Zero.

[1]Table includes data available through January 11, 2011.

[2]Produced entirely from imported bullion and includes the lead content of alloys.

[3]Includes a small quantity of primary lead from domestic concentrate.

[4]Refined nickel.

[5]Includes witherite.

[6]Reported figure.

[7]Sales, dry weight.

[8]Salable product.

[9]Proportions of grades not available; probably about two-thirds acid grade.

[10]Not elsewhere specified.

[11]Methane, excluding gas flared or reinjected.

[12]Excludes gases and condensates.

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TABLE 2
UNITED KINGDOM: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities[1]	Annual capacity
Aluminum:			
Primary	Rio Tinto Alcan Ltd.	Lynemouth Smelter, Northumberland County, England	169
Do.	do.	Lochaber Smelter, Fort William County, Scotland	41
Do.	Anglesey Aluminium Metal Ltd. (Rio Tinto Corp., 51%, and Kaiser Aluminum and Chemical Corp., 49%)	Holyhead, Gwynedd County, Wales	144
Secondary	Hydro Aluminium Deeside Ltd. (Hydro Aluminium AS)	Wrexham, Clwyd County, Wales	55
Do.	Cohen Alloys Ltd.	Glasgow, Scotland	NA
Do.	Coleshill Aluminium Ltd.	Coleshill, Warwickshire, England	NA
Do.	Dolgarrog Aluminium Ltd.	Dolgarrog, Conwy, Gwynedd County, Wales	9
Barite	M-I Drilling Fluids (UK) Ltd.	Foss Mine, near Aberfeldy, Perthshire County, Scotland	50
Do.	Glebe Mines Ltd.	Arthurton West, Bow Rake, High Rake, and Watersaw Mines, Southern Pennine Orefield, Derbyshire County, England	15
Celestite	Bristol Minerals Co. Ltd.	Yate, Avon County, England	30
Cement	Lafarge Cement UK, Ltd. (Lafarge Group)	Aberthaw plant, East Aberthaw, Barry, South Glamorgan County, Wales	500
Do.	do.	Barnstone plant, near Langar, Nottinghamshire County, England	-- [2]
Do.	do.	Cauldon plant, near Leek, Staffordshire County, England	1,000
Do.	do.	Cookstown plant, Cookstown, County Tyrone, Northern Ireland	500
Do.	do.	Dunbar plant, Dunbar, East Lothian, Scotland	1,000
Do.	do.	Hope plant, Hope Valley, Derbyshire County, England	1,300
Do.	do.	Northfleet plant, Northfleet, Kent County, England	1,000
Do.	do.	Westburyplant Westbury, Wiltshire County, England	700
Do.	Castle Cement Ltd. (Heidelberg Cement AG, 100%)	Ketton plant, Rutland County, near Stamford, Lincolnshire County, England	1,400
Do.	do.	Padeswood plant, Mold, Flintshire County, Wales	1,400
Do.	do.	Ribblesdale plant, Clitheroe, Lancashire County, England	1,400
Do.	CEMEX UK Operations, Ltd. (CEMEX, S.A.B. de C.V., 100%)	Rugby plant, Rugby, Warwickshire County, England	1,800
Do.	do.	Barrington plant, Barrington, Cambridgeshire County, England	300
Do.	do.	South Ferriby plant, North Lincolnshire County, England	800
Do.	Tarmac Buxton Lime and Cement Industries Ltd.	Tunstead plant, Buxton, Derbyshire County, England	800
Clay:			
Ball clay	WBB Minerals (S.C.R.-Sibelco NV)	Various operations in northern and southern Devon County, England	500
Do.	Imerys Group	Operations in Bovey and Wareham Basins, Dorset County, England	300
China clay (kaolin)	do.	Mines and plants in Cornwall and Devon Counties, England	3,000
Do.	WBB Minerals (S.C.R.-Sibelco NV)	Mines and plants in Cornwall County, England	1,000

See footnotes at end of table.

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TABLE 2—Continued
UNITED KINGDOM: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities[1]	Annual capacity
Coal				
Underground mines		UK Coal plc	Operations in England include the Daw Mill Colliery, Warwickshire County; the Kellingley Colliery, North Yorkshire County; the Maltby Colliery, Rotherham, Yorkshire County; the Thoresby Colliery, Nottinghamshire County; the Welbeck Colliery, Nottinghamshire County	30,000
Do.		Goitre Tower Colliery Ltd.	Tower Colliery, Hirwaun, Mid Glamorgan County, Wales	500
Surface pits		Scottish Coal Company Ltd.	Operations in Scotland include the Broken Cross pit near Douglas, South Lanarkshire County; Chalmerston pit, Dalmellington, East Ayrshire County; Chapelhill, South Lanarkshire County; Glentaggart pit, near Douglas, South Lanarkshire; Newbigging Farm pit, near Howgate, Midlothian County; Powharnal pit, near Muirkirk, East Ayrshire County, St. Ninians (Greenbank) pit, northeast of Dunfermline, Fife	4,000
Do.		ATH Resources PLC	Operations in Scotland include the Grievehill, the Laigh Glenmuir, and the Skares road pits in Ayrshire County; Glenmuckloch pit, Dumfries and Galloway County	1,600
Do.		Celtic Energy Ltd.	Margam pit, near Bridgend, Mid Glamorgan County, Wales	350
Do.		do.	Nant Helen Extension pit, Abercraf, West Glamorgan, Wales	400
Do.		do.	Selar pit, Glynneath, West Glamorgan, Wales	400
Do.		Energybuild Ltd.	Nant-y-Mynydd pit, Neath, West Glamorgan, Wales	130
Do.		H.J. Banks Mining (Banks Group)	Dehli pit, Stannington, Northumberland County, England	NA
Fluorspar		Glebe Mines Ltd.	Mill at Stoney Middleton, mines in Derbyshire County, England	60
Gold	kilograms	Galantas Gold Corp.	Omagh Mine, near Omagh, County Tyrone, Northern Ireland	900 [3]
Gypsum		British Gypsum Ltd.	Several mines and quarries in England, which include the Barrow Mine, Barrow upon Soar, southeast of Loughborough, Leicestershire County; the Brightling Mine, Robertsbridge, East Sussex County; the Birkshead Mine, Kirby Thore, near Penrith, Cumbria County; the Fauld Mine, Tutbury, near Burton on Trent, Staffordshire County; the Kilvington Quarry, Staunton in the Vale, Kilvington, Nottinghamshire County; the Marbleegis Mine, East Leake, northeast of Loughborough, Leicestershire County; the Newbiggin Mine, Newbiggin, near Kirby Thore, Cumbria County	3,500
Lead:				
Primary		Britania Refined Metals Ltd. (Xstrata plc)	Northfleet, Kent County, England	180
Secondary		Britannia Recycling Ltd. (Xstrata plc)	Wakefield, West Yorkshire County, England	20
Do.		H.J. Enthoven Ltd. (Quexco Inc., 100%)	Darley Dale, Derbyshire County, England	75
Natural gas	billion cubic meters per year	Numerous domestic and international oil companies	North Sea gasfields	100

See footnotes at end of table.

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TABLE 2—Continued
UNITED KINGDOM: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities[1]	Annual capacity
Nickel, refined		INCO Europe Ltd. (CVRD INCO Ltd.)	Clydach Refinery, near Swansea, West Glamorgan County, Wales	30
Nitrogen, N content of ammonia		Terra Nitrogen Ltd.	Billingham, Durham County, England, and Severnside, near Bristol, Avon County, England	550
Do.		GrowHow UK Ltd. (Kemira GroHow Oyj)	Ince, Lancashire County, England	400
Petroleum:				
Crude	million 42-gallon barrels per day	Numerous domestic and international oil companies, which include Apache North Sea Ltd., BG Group, BHP Billiton Ltd., BP p.l.c., Challenger Minerals Inc., Chevron Ltd., ConocoPhillips Ltd., Dana Petroleum plc, Eni S.p.A., Exxon Mobil Corp., Hess Corp., Lundin Britain Ltd., Maersk Oil UK Ltd., Marathon Oil U.K. Ltd., Midmar Energy Onshore Ltd., Nexen Petroleum Inc., Noble Energy (Europe) Ltd., Oilexco Inc., Perenco UK Ltd., Petro-Canada UK Ltd., Premier Oil plc, Royal Dutch Shell plc, Statoil (U.K.) Ltd.,Talisman Ltd., Total S.A., and Tullow Oil (U.K.) Ltd.	North Sea oilfields	2
Refined	million 42-gallon barrels	Exxon Mobil Corp.	Fawley refinery, Southampton, Hampshire County, England	120
Do.	do.	Royal Dutch Shell plc	Stanlow manufacturing complex, Ellesmere Port, Cheshire County, England	100
Do.	do.	ConocoPhillips Ltd.	Humber refinery, South Killingholme, North Lincolnshire County, England	90
Do.	do.	Total S.A,	Lindsey refinery, Killingholme, North Lincolnshire County, England	85
Do.	do.	Chevron Ltd.	Pembroke refinery, Pembroke, Dyfed County, Wales	82
Do.	do.	Ineos Group	Grangemouth refinery, Grangemouth, Stirling County, Scotland	80
Do.	do.	BP p.l.c.	Coryton refinery, Stanford-le-Hope, Essex County, England	80
Do.	do.	Petroplus Holdings AG	Teesside refinery, Middlesborough, Cleveland County, England	43
Do.	do.	Total S.A., 70%, and Murco Petroleum Ltd., 30%	Milford Haven, Dyfed County, Wales	40
Do.	do.	Eastham Refinery Ltd. (Shell UK Ltd., 50%, and AB Nynas Ltd., 50%)	Eastham refinery, Ellesmere Port, Cheshire County, England	9
Do.	do.	AB Nynas Ltd.	Dundee refinery, Dundee, Scotland	4
Platinum-group metals		Johnson Matthey plc	Refineries at Enfield (London) and Royston, Hertfordshire County, England	NA
Do.		CVRD Inco Ltd.	Acton refinery, London, England	NA
Potash		Cleveland Potash Ltd. (Israel Chemicals Ltd., 100%)	Boulby Mine, Yorkshire County, England	1,000
Salt:				
Road		do.	do.	600
Rock		British Salt Ltd.	Middlewich, Cheshire County, England	800
Do.		Irish Salt Mining and Exploration Co. Ltd.	Kilroot Mine, Carrick Fergus, Northern Ireland	500
Sand and gravel		Hanson plc (Heidelberg, 100%)	Various offshore and onshore locations	NA
Silica sand		WBB Minerals (S.C.R.-Sibelco NV)	Various operations in Cheshire, Humberside, and Norfolk Counties, England	5,000
Do.		Hanson plc	Various locations	NA

See footnotes at end of table.

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TABLE 2—Continued
UNITED KINGDOM: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities[1]	Annual capacity
Slate, natural	Alfred McAlpine Slate Ltd. (Welsh Slate)	Operations in Wales include the Penrhyn quarry, Bethesda, Conwy County; the Pen Yr Orsedd quarry, Nantlle, Gwynedd County; quarries at Blaenau Ffestiniog and Cwt y Bugail, Gwynedd County	1,000
Do.	Greaves Welsh Slate Company Ltd.	Llechwedd Slate Mines, Blaenau Ffestiniog, Gwynedd County, Wales	NA
Soda ash	Brunner Mond Group (Tata Chemicals Ltd.)	Northwich, Cheshire County, England	900
Steel	Tata Steel Europe (Tata Steel Group)	Scunthorpe Works, Scunthorte, Lincolnshire County, England	4,500
Do.	Tata Steel Europe Teesside Cast Products (Tata Steel Group)	Teesside Works, Redcar, Cleveland County, England	3,900
Do.	Tata Steel Europe Strip Products UK (Tata Steel Group)	Port Talbot works, Port Talbot, West Glamorgan, Wales	3,750
Do.	Tata Steel Europe Engineering Steels (Tata Steel Group)	Rotherham Works, Rotherham, South Yorkshire County, England	1,200
Do.	do.	Stocksbridge Works near Sheffield, South Yorkshire County, England	NA [4]
Do.	Tata Steel Europe Special Profiles (Tata Steel Group)	Skinningrove, Carlin How, near Saltburn-by-the-Sea, Cleveland County, England	NA
Do.	Celsa Manufacturing Ltd. (Grupo Celsa, 100%)	Tremorfa Works, Cardiff, South Glamorgan County, Wales	850
Stone, crushed	Hanson plc	90 quarries in various locations	70,000
Talc	Alex Sandison and Son Ltd.	Unst, Shetland Islands	15
Tin, ore	Baseresult Holdings Ltd.	South Crofty Mine, Cornwall County, England	NA [5]

NA Not available. -- Zero.

[1]May include historic, postal, or preserved counties instead of current regional governments, such as cities, county boroughs, or unitary authorities.

[2]Grinding plant only. Kilns closed in May 2006.

[3]Under construction.

[4]Remelt facilities.

[5]Mine has been on care and maintenance status (but open for tours) since operations were suspended in 1998. Redevelopment of the mine is underway.

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The Mineral Industry of Uzbekistan

By Richard M. Levine

Uzbekistan was a significant regional producer of a number of mineral commodities, including nonferrous metals and natural gas, and it was a major world producer of two mineral commodities—gold and uranium. Minerals were extracted from more than 400 mines, open pits, and oil and gas wells. The two leading mineral production enterprises in the country were the Almalyk and the Navoi mining and metallurgical complexes.

Minerals in the National Economy

In 2009, Uzbekistan's real gross domestic product increased by an estimated 8.1% compared with that of 2008. The global economic downturn had little effect on Uzbekistan's economy, primarily because of its relative isolation from the global financial markets. Mineral exports were a major source of revenue for the Government. Exports of natural gas and petroleum accounted for about 40% of Uzbekistan's foreign exchange earnings in 2009, and natural gas was the country's leading export earner. Other major mineral export earners included gold and uranium; in 2009, gold accounted for between 7% and 10% of the country's export earnings. Of all exports to the United States, uranium was Uzbekistan's leading export earning commodity (U.S. Department of State, 2009; U.S. Central Intelligence Agency, 2010).

Production

Data on the production of most minerals were not available. Because Uzbekistan was reportedly not significantly affected by the economic downturn in the world economy in 2009, mineral production was estimated to have remained at about its 2008 level. Natural gas production, however, was estimated to have decreased owing to a reported decrease in crude oil production, the fact that Uzbekistan curtailed gas exports to Kyrgyzstan and Tajikistan, and the lack of reported data on natural gas. In the past, a lack of reported production data on commodities that previously had been reported regularly has been an indication of a decline in output. Data on mineral production are in table 1.

Structure of the Mineral Industry

Table 2 is a list of major mineral industry facilities.

Commodity Review

Metals

Copper and Zinc.—The Almalyk mining and metallurgical complex, which is located in a large copper porphyry region, mined the Kalmakyr and the Sary-Cheku copper deposits in the Toshkent Viloyati [Province] and the Uchkulach lead-zinc-barite deposit in the Jizzax region (Uzbekistan Daily, 2010). Almalyk was composed of eight mining enterprises, four beneficiation plants, and two metallurgical plants (Interfax Russia & CIS Metals and Mining Weekly, 2008; OAO Almal'ykskiy GMK, 2008). In addition to copper, Almalyk produced molybdenum and zinc and was Uzbekistan's second ranked gold and silver producer. Almalyk produced all the country's copper and zinc output, 90% of its silver output, and 20% of its gold output. Zinc metal production at Almalyk was by toll smelting ore. Almalyk planned to increase the copper metal production capacity by about 9,000 metric tons per year (t/yr). Zinc metal output was expected to remain at its current level (Interfax Russia & CIS Metals and Mining Weekly, 2008, 2010a).

In more than 50 years of mining, only about 20% of Almalyk's copper reserves (calculated according to the Soviet reserve classification system) had been depleted. The Almalyk complex was processing about 30 million metric tons per year (Mt/yr) of ore, and the metallurgical plant had the potential to increase production significantly. Ore from Almalyk also contained gold, rhenium, selenium, silver, sulfur, and tellurium. Production of these metals as byproducts accounted for 40% of the value of Almalyk's output (Mavlyanov and others, 2007; Interfax Russia & CIS Metals and Mining Weekly, 2008).

In 2009, Almalyk started a $98.7 million project to renovate and expand the Kalmakyr copper mine, which was commissioned in 1957. The project was to be completed by late 2011. The design extraction capacity at Kalmakyr, which was 27 Mt/yr of ore, was to be increased by 3.5 Mt/yr. The Kalmakyr copper porphyry deposit contains copper, gold, molybdenum, rhenium, selenium, silver, and tellurium (Interfax Russia & CIS Metals and Mining Weekly, 2010a).

Almalyk planned to fully launch an ore mining and processing complex at the Khandiza deposit in July 2010. The project would include an underground mine and an ore processing facility with the capacity to process 650,000 t/yr of ore. The complex was to have the capacity to produce up to 5,000 t/yr of copper concentrate, 20 t/yr of lead concentrate, and 60,000 t/yr of zinc concentrate. In 2010, Almalyk also would start implementation of a project to expand and renovate mining at the Sary-Cheku deposit (Uzbekistan Daily, 2010).

Gold.—The country's main reserves of gold and uranium are located in the Central Qizilqum region between the Amu Darya River and the Syr Darya River. The ores were mined and processed by the Navoi mining and metallurgical complex (NMMC), which was part of the Uzbekistan state holding company Kyzylkumredmetzoloto. The complex included more than 20 gold deposits in western Uzbekistan, of which the largest by far was the Muruntau deposit, which is one of the world's largest gold deposits. Gold from this deposit was mined from an open pit and processed at two gold recovery plants—GMZ-2 in Zerafshan and GMZ-3 in Uchkuduk. NMMC's gold production had increased by 64% since the country achieved independence in 1991 (Sanakulov and Shemetov, 2010).

Future growth in gold production at NMMC would be based on further developing open pit mining and developing

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underground mining at the Muruntau deposit, as well as extracting gold from overburden and tailings through heap leaching, In addition, open pit development was to take place at the Daugyztau and the Kokpatas deposits, and the development of underground mining was to take place at the Zarmitanskoye deposit. Investment of approximately $1 billion would be required to complete this development work. Development would involve extracting ore that had been classified as low grade and subeconomic (Sanakulov and Shemetov, 2010).

Indium, Selenium, and Tellurium.—Four porphyry copper deposits (the Dalneye, the Kalmakyr, the Kyrzyta, and the Sary-Cheku deposits), which were part of the Almalyk mining and metallurgical complex, were assessed to contain 13,228 t of selenium and 1,098 t of tellurium (United States Trade and Development Agency, 1996, p. 29). Indium was also contained in the country's copper deposits. Reserves of copper at copper deposits that were being mined were reportedly considered adequate for 50 years at the rate of production of 2000 (Rakhimov and Alimkhodzhayev, 2001). The large Dalneye copper deposit, which had not been developed, reportedly had significant amounts of selenium and tellurium in the ore. The Khandiza lead-zinc deposit, which was under development, reportedly contains among its numerous ore constituents indium and selenium that were considered potentially economic to recover (Rakhimov and Alimkhodzhayev, 2001).

Tungsten.—Uzbekistan had approved a program for the period 2007 to 2013 for the development of tungsten deposits. Production was eventually to reach 2,700 Mt/yr. The program called for fully utilizing existing capacity at the Uzbek refractory and hard metals plant in Toshkent Viloyati, which had been processing material under tolling contracts from Russia. Plans called for constructing a beneficiation plant at the Yakhton tungsten deposit with the capacity to produce 870 t/yr of tungsten concentrate. The Yakhton tungsten deposit reportedly has reserves in the C1 category (a reserve category of lesser reliability than the categories A and B1, based on the reserve classification system that had been used in the Soviet Union and still was in use in many of the successor states) of approximately 5.6 million metric tons (Mt) of ore containing 22,000 t of tungsten trioxide. The Sautbay tungsten deposit reportedly has C1 reserves of 4 Mt containing 19,900 t of tungsten trioxide and could produce 1,260 t/yr of concentrate by 2013. Plans for the Sautbay deposit envisioned restarting a mine with the capacity to produce at least 300,000 t/yr of ore and for a beneficiation plant to be built at the site. The Ingichka tungsten deposit, at which mining had ceased, contains an estimated 11.6 Mt of ore in the C1 category with 65,000 t of tungsten trioxide (Interfax Russia & CIS Metals and Mining Weekly, 2010b).

In February 2010, Uzbekistan's State Geology and Mineral Resources Committee (Goskomgeo) signed an agreement of intent with Luxon Energy Holdings Ltd. of the Republic of Korea to restart production at the Ingichka tungsten mine, which is located in the Samarqand region. The founding documents were to be signed in the second half of 2010. The project would reportedly cost $50 million to build. Also, Goskomgeo could potentially form a $30 million joint venture with Shindong Resources Co. Ltd. of the Republic of Korea to develop the Sautbay and Yakhton deposits, which also are located in the Samarqand region (Interfax Russia & CIS Metals and Mining Weekly, 2010b; Uzbekistan Daily, 2010).

Industrial Minerals

Lithium.—Uzbekistan reportedly has more than 120,000 t of lithium dioxide reserves contained in volcanogenic deposits of lithium carbonaceous tuffaceous aleurolite in the Shavazsay deposit in Toshkent Viloyati. Byproduct components in the ore reportedly include 3,200 t of cesium oxide and 8,900 t of rubidium oxide. The deposit could be developed by open pit mining. Development could take place with the recovery of 78% of the lithium salts and would include byproduct production of potash and potassium sulfate and wastes that could be used in the production of cement (Mavlyanov and others, 2007).

In February 2010, Goskomgeo signed agreements of intent to form joint ventures with companies from the Republic of Korea to develop lithium and tungsten deposits, with the founding documents to be signed during the second half of 2010. Goskomgeo planned to form a 50-50 joint venture with Shindong Enercom of the Republic of Korea by the end of 2010 to develop the Shavazsay lithium deposit. The cost of the project was estimated to be $50 million. The lithium was to be used to produce lithium batteries in Uzbekistan (Interfax Russia & CIS Metals and Mining Weekly, 2010b).

Mineral Fuels and Related Materials

Natural Gas and Petroleum.—Oil production from Uzbekistan had declined since 2003 because of the lack of new investment and technical capacity to bring new oilfields online. Uzbekistan has large natural gas reserves, but development of these reserves was constrained by the lack of available natural gas transport infrastructure. Recent agreements with international companies and the Governments of other countries could help Uzbekistan find alternative export routes that could increase its hydrocarbon exports. In December 2009, the new 1,833-kilometer gas pipeline from Turkmenistan to China was commissioned. The pipeline, which starts in Turkmenistan near the border with Uzbekistan and passes through the territory of Uzbekistan and Kazakhstan, will provide Uzbekistan with additional gas export capacity (Window of China, 2009). Although Uzbekistan consumes most of it natural gas production domestically, it does export significant quantities of natural gas to Russia and to other countries in the region through the Russia-owned and -operated gas pipeline network. Countries in the region that were being supplied with gas from Uzbekistan included Kazakhstan, Kyrgyzstan, and Tajikistan. OAO Gazprom of Russia used some of Uzbekistan's gas bound for Russia to supply Ukraine. In total, Uzbekistan exported about 16 billion cubic meters of gas in 2008, of which about 12 billion cubic meters went to Russia and about 4 billion cubic meters went to countries in Central Asia (APS Review Oil Market Trends, 2008; U.S. Energy Information Administration, 2009).

In 2009, Uzbekistan, which previously had raised the price of its gas, reduced gas shipments to Tajikistan because Tajikistan was not meeting its payments for the gas; Tajikistan was almost entirely dependent on gas from Uzbekistan. Uzbekistan also

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temporarily reduced gas supplies to Kyrgyzstan because of nonpayment (Business Monitor International, 2009). In 2009, Lukoil Uzbekistan Operating Co., which was a wholly owned subsidiary of OAO Lukoil of Russia, increased gas reserves at the Hauzak-Shady field in Uzbekistan by 20 billion cubic meters as the result of followup exploration. The Uzbek State Reserves Commission endorsed the increase in reserves. In December 2009, Lukoil Uzbekistan also successfully tested another exploration well, which produced a commercial gas flow, and added 3 billion cubic meters to the reserves. Lukoil planned to invest approximately $5 billion in the Hissar and the Kandym gas projects in Uzbekistan during the next 7 years to produce more than 12 billion cubic meters per year of gas there. Lukoil began producing gas in Uzbekistan under the Kandym-Hauzak-Shady production-sharing agreement in the fall of 2007. Proven gas reserves at Kandym-Hauzak-Shady were reportedly 329 billion cubic meters. All natural gas produced from these projects was to be exported through Gazprom's pipeline network (Interfax Russia & CIS Oil and Gas Weekly, 2010a).

In March 2008, Lukoil Overseas Holding Ltd., which was a subsidiary of OAO Lukoil, closed a deal to acquire new assets in Uzbekistan for about $580 million. The contract area had seven fields: the Adamtash, the Amanata, the Dzharkuduk-Yangi Kyzylcha, the Gumbulak, and the Pachkamar gas condensate fields, the South Kyzylbairak oil and gas condensate field, and the Koshkuduk oilfield. Small amounts of oil and gas condensate were being produced at the South Kyzylbairak and Koshkuduk fields. The group of fields has C1 resources of about 100 billion cubic meters of gas and about 6 Mt of liquid hydrocarbons (oil and gas condensate). Anticipated production in the contract area was about 3 billion cubic meters of gas and more than 300,000 t/yr of liquid hydrocarbons—a level that the company expected to achieve within several years but had not yet produced (Interfax Russia & CIS Oil and Gas Weekly, 2010a).

Uzbekneftegaz was planning to commission a unit costing about $221 million to produce a propane-butane mix at the Mubarek gas treatment plant, which would enable Uzbekistan to double liquefied natural gas (LNG) output and have it rank among the world's major suppliers of LNG. In January 2009, Zeromax GmbH of Switzerland won a tender to build the plant, which was to process 12 billion cubic meters of natural gas annually to produce up to 258,000 t/yr of LNG and to recover 125,000 t/yr of condensate. More than 80% of the new plant's output was to be exported. The project was being funded by loans from China Development Bank, Uzbekistan Reconstruction and Development Bank, Uzbekneftegaz, and local commercial banks (Interfax Russia & CIS Oil and Gas Weekly, 2010b).

Uranium.—The Uzbekistan State Committee for Safety in Industry and Mining (Gosgortekhnadzor) supervised ministries engaged in mining. The Nuclear Regulations Inspectorate under Gosgortekhnadzor had responsibility for the control and supervision of the research reactors and all nuclear and radioactive materials (including spent fuel) in Uzbekistan. Uranium mining in Uzbekistan was conducted at NMMC by six mining directorates. These directorates employed in situ leaching to extract ore from 13 deposits at a depth of from 120 to 600 meters (Sanakulov and Shemetov, 2010).

According to the 2007 Organization for Economic Co-operation and Development (OECD) Nuclear Energy Agency (NEA) & International Atomic Energy Agency (IAEA) Red Book, Uzbekistan has 111,000 metric tons (t) of uranium of reasonably assured resources and inferred resources assessed at $130 per kilogram of uranium. Goskomgeo reported that, in 2008, the country's explored and estimated uranium reserves were 185,800 t (World Nuclear Association, 2010).

NMMC undertook all uranium mining in the country. All uranium mined and milled in Uzbekistan was sent to Russia before 1992. Since 1992, Uzbekistan had exported all its uranium production to the United States and other countries through Nukem, Inc. of the United States. In 2008, Korea Electric Power Corp. of the Republic of Korea signed agreements to purchase 2,600 t of uranium during a 6-year period until 2015 (World Nuclear Association, 2010).

NMMC began mining uranium and gold at the end of the 1950s in the desert region of the Central Qizilqum region. Uranium mining was conducted by underground mining until 1990 and open pit mining until 1994, but since then, the in situ leach (ISL) method has been the only process used to recover uranium. During the Soviet era, Uzbekistan provided much of the uranium used by the Soviet military-industrial complex. The country's annual production peaked at 3,800 t of uranium in the mid-1980s. Uranium production activities had been centered in the following five company towns that were constructed for this purpose: Navoiy, Nurabad, Uchkuduk, Zafarabad, and Zarafshan (World Nuclear Association, 2010).

The Central mining district #5 at Zafarobod near the town of Navoiy was established by an entity in the Buxoro area in 1971, but became part of the NMMC in 1993. Mining took place by the ISL method at the Bukinay group of uranium deposits (the Beshkak, the Lyavlyakan, the North Bukinay, the South Bukinay, and the Tokhumbe Mines). Resources in the Central District reportedly were 52,000 t of uranium (World Nuclear Association, 2010).

The Northern mining district was established 300 kilometers (km) north of Navoiy to mine uranium at Uchkuduk. Mining had taken place there since 1961 by underground and open pit methods. Since 1965, however, ISL had been used at the Kendykijube and the Uchkuduk mining centers. Ore was treated at the NMMC plant in Navoiy. Remaining resources are reportedly 51,000 t of uranium. Sulfuric acid was produced in the district in conjunction with copper smelting (World Nuclear Association, 2010).

In 1964, the Southern mining district at Nurobod, Samarqand Viloyati, was developed to mine the Sabirsay uranium deposit. Mining was conducted by underground mining methods until 1983. Since then, uranium extraction was by ISL. Other mines in this district were the Ketmenchi, the Shark, and the Ulus. Resources in the Southern district were reportedly 13,000 t of uranium (World Nuclear Association, 2010).

Resources in the Zeravshan district (or the eastern mining district), which is located about 160 km north of Navoiy, were reportedly 50,000 t of uranium. In this district, mining took place at the Sugraly deposit by underground mining and ISL until mining ceased in 1994. Compagnie Générale des Matières Nucléaires of France (a predecessor company of Areva SA)

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undertook a project to redevelop the Sugraly deposit, which had reported resources of 38,000 t of uranium. The project was abandoned in 1999 after negotiations for a joint-venture agreement with NMMC failed. Sugraly was described as a thick sandstone deposit with complex mining and geologic conditions and a high carbonate content (WISE Uranium Project, 2009; World Nuclear Association, 2010).

NMMC also mined the Chauly uranium deposit, but mining there appeared to have been switched to extracting phosphorites. NMMC started mining the large Northern Kanimekh deposit, which is located northwest of Navoiy. Ore at Northern Kanimekh occurs at depths of between 260 and 600 meters (m), and 77% of the uranium reserves occur at depths of between 400 and 500 m. In November 2008, a startup uranium mining facility at Northern Kanimekh was commissioned; the facility was expected to achieve full capacity in 2012. NMMC also started constructing a pilot plant for ISL at the Alendy and the Yarkuduk deposits (World Nuclear Association, 2010).

The major portion of the growth in uranium output from 2008 to 2012 was expected to come from the development of new deposits. In 2009, NMMC was to start developing mines at the Meilysai and the Tutlinskaya Ploshchad deposits. Other deposits slated for development included the Alendy, the Aul'bek, the Flangi Ketmenchi, the Severnyy Mayzak, the Yarkuduk, and the Yuzhniy Sugraly. Production was planned to increase to 4,000 t of uranium by 2012 (Sanakulov and Shemetov, 2010).

By the end of 2012, NMMC planned to invest $165 million in upgrades to expand existing mining and processing capacities, to renew its stock of processing equipment, and to develop as many as seven new mines. Plans by Uzbek authorities called for holding open auctions for the development of seven of the country's uranium deposits. Tenders were expected to be ready by March 2010. The country was also expanding sulfuric acid production as part of it plans to increase uranium production to 2012, as increased sulfuric acid would be necessary to increase uranium extraction. Early in 2009, however, the President of Uzbekistan said that the world economic crisis would slow all development (WISE Uranium Project, 2009).

In mid-2009, Goskomgeo and the Japan Oil, Gas and Metals National Corp. (JOGMEC) signed an agreement to explore for uranium and rare earths in the Navoiy region. Exploration was to focus on ISL-type sandstone deposits and black shales. It was envisioned that a Japanese company would take a 50% interest in any resources that were identified and in developing them. In August 2009, Goskomgeo and China Guangdong Nuclear Uranium Corp. (CGNURC) established a 50-50 uranium exploration joint venture called Uz-China Uran, which was to focus on exploration of black shale deposits in the Boztauskaya area of the Navoiy region (World Nuclear Association, 2010).

Outlook

Uzbekistan was planning to develop or increase production of a number of mineral resources, which could be of increasing importance if technologies are adopted in increasing measure in the world economy to replace the use of hydrocarbons as fuel. These resources include lithium, which can be used in lithium ion batteries used to power electric cars; and indium, selenium, and tellurium, which could be used in technologies to produce renewable energy, such as solar cells. Uzbekistan also plans to expand its production of uranium, for which there could be increased demand with the expansion of nuclear power. The country also plans to expand production of natural gas, which is not only a major source of energy but also could serve as a transition fuel while renewable energy technologies are being developed, because the use of natural gas produces less greenhouse gas emissions than oil and coal.

References Cited

APS Review Oil Market Trends, 2008, Uzbekistan—Part 3—Oil and gas exports: Entrepreneur. (Accessed August 13, 2010, at http://www.entrepreneur.com/tradejournals/article/187839549.html.)

Business Monitor International, 2009, Tashkent reduces gas exports to Tajikistan and Kyrgyzstan: Business Monitor International, June 17. (Accessed August 13, 2010, at http://store.businessmonitor.com/article/266081.)

Interfax Russia & CIS Metals and Mining Weekly, 2008, Uzbekistan's Almalyk reduces copper output 3.6% in 2007: Interfax Russia & CIS Metals and Mining Weekly, issue 6, February 8-14, p. 13.

Interfax Russia & CIS Metals and Mining Weekly, 2010a, Uzbekistan's Almalyk to invest $100 mln in copper mine expansion: Interfax Russia & CIS Metals and Mining Weekly, issue 2, January 15-21, p. 18.

Interfax Russia & CIS Metals and Mining Weekly, 2010b, Uzbek, Korean firms to form tungsten, lithium joint ventures: Interfax Russia & CIS Metals and Mining Weekly, issue 9, March 5-11, p. 10-11.

Interfax Russia & CIS Oil and Gas Weekly, 2010a, Lukoil grows gas reserves at Uzbek field by 20 bcm in 2009: Interfax Russia & CIS Oil and Gas Weekly, issue 6, February 25-March 3, p. 26.

Interfax Russia & CIS Oil and Gas Weekly, 2010b, Uzbekneftegaz to launch $221-mln propane-butane mix unit in Dec: Interfax Russia & CIS Oil and Gas Weekly, issue 6, February 25-March 3, p. 29.

Mavlyanov, N.G., Turamradov, I.B., and Isakhodzhaev, B.A., 2007, Mineral'no-syr'yevaya baza Respubliki Uzbekistana [The mineral raw material base of the Republic of Uzbekistan]: Gornyy Zhurnal [Mining Journal.], no. 10, p. 63-68.

OAO Almal'ykskiy GMK, 2008, O Kombinat [About the complex]: OAO Almal'ykskiy GMK, August 27. (Accessed August 14, 2010, at http://www.agmk.uz/index.php?option=com_content&task=view&id=28&Itemid=53&lang=russian.)

Rakhimov, V.R., and Alimkhodzhayev, S.R., 2001, Razvitiye mineral'nogo-syr'yevoy bazy gornodobyvayushchey promyshlennosit Uzbekistana v goristykh rayonov [The development of the mineral-raw material base of Uzbekistan's mining industry in the mountainous regions]: Gornyy Zhurnal [Mining Journal], no. 10, p. 131-133.

Sanakulov, K.S., and Shemetov, P.A., 2010, Formirovanie usloviy ustoychivogo razvitiya Tsentral'no-Kyszylkumskoya gornorudnoye provintsii [The formation of conditions for the sustainable development of the Central Kyzylkum province]: Gornyy Zhurnal [Mining Journal], no. 4, p. 31-33.

United States Trade and Development Agency, 1996, Investment opportunities in mining and minerals in Uzbekistan: United States Trade and Development Agency June 28, 150 p.

U.S. Central Intelligence Agency, 2010, Uzbekistan, *in* The world factbook: U.S. Central Intelligence Agency. (Accessed August 1, 2010, at https://www.cia.gov/library/publications/the-world-factbook/geos/uz.html.)

U.S. Department of State, 2009, Uzbekistan: U.S. Department of State background note, October 16. (Accessed August 1, 2010, at http://www.state.gov/r/pa/ei/bgn/2924.htm.)

U.S. Energy Information Administration, 2009, International energy data and analysis for Uzbekistan: U.S. Energy Information Administration, February 17. (Accessed March 19, 2009, at http://tonto.eia.doe.gov/country/country_energy_data.cfm?fips=UZ.)

Uzbekistan Daily, 2010, AGMK continues development of its capacities: Uzbekistan Daily, July 12. (Accessed August 14, 2010, at http://www.uzdaily.com/articles-id-10803.htm.)

Window of China, 2009, Chinese, Turkmen, Kazakh, Uzbek presidents unveil gas pipeline: Windows of China, December 14. (Accessed August 12, 2010, at http://news.xinhuanet.com/english/2009-12/14/content_12645369.htm.)

Digitized by Google

WISE Uranium Project, 2009, New uranium mining projects—Asia: World Information Service on Energy, March 6. (Accessed March 18, 2009, at http://www.wise-uranium.org/upasi.html.)

World Nuclear Association, 2010, Uranium in Central Asia: World Nuclear Association, June. (Accessed August 13, 2010, at http://www.world-nuclear.org/info/inf118_centralasiauranium.html.)

TABLE I

UZBEKISTAN: PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Metric tons unless otherwise specified)

Commodity		2005	2006	2007	2008	2009[e]
METALS						
Aluminum, secondary[e]		3,000	3,000	3,000	3,000	3,000
Copper:						
Mine output, Cu content		103,500	100,000	95,000	95,000	100,000
Metal:						
Blister[e]		105,000	95,000	92,000	92,000	97,000
Refined		103,870	92,300	89,655	90,000 [e]	95,000
Gold[e]	kilograms	84,210 [3]	84,000	85,000	85,000	85,000
Molybdenum, mine output, Mo content[e]		575	600	600	500	500
Rhenium[e]	kilograms	NA	850	900	900	900
Silver, mine output[e]	do.	83,000	83,000	83,000	83,000	83,000
Steel:						
Crude		607,253	592,450	740,000 [e]	680,000 [e]	716,400
Rolled		576,500	560,000	700,000	640,000	670,000
Zinc, metal, smelter, primary		35,030	45,000 [e]	71,800	70,445	70,000
INDUSTRIAL MINERALS						
Cement[e]		5,068,000 [3]	5,700,000	6,500,000 [3]	6,600,000	6,700,000
Clays:[e]						
Bentonite		15,000	15,000	15,000	15,000	15,000
Kaolin		216,600 [3]	251,000 [3]	250,000	250,000	250,000
Feldspar[e]		4,300	4,300	4,300	4,300	4,300
Fluorspar[e]		85,000 [3]	88,000 [3]	90,000	90,000	90,000
Graphite[e]		60	60	60	60	60
Gypsum[e]		80,000	80,000	80,000	80,000	80,000
Iodine[e]	kilograms	2,000	2,000	2,000	2,000	2,000
Nitrogen, N content of ammonia[e]		880,000	940,000	1,000,000	1,000,000	1,000,000
Phosphate rock:[e]						
Gross weight		430,000 [3]	600,000	600,000	600,000	600,000
P_2O_5 content		102,000	140,000	140,000	140,000	140,000
Sulfur:[e]						
Byproduct:						
Metallurgy		170,000	170,000	170,000	170,000	170,000
Natural gas and petroleum		350,000	350,000	350,000	350,000	350,000
Total		520,000	520,000	520,000	520,000	520,000
Sulfuric acid		740,500 [3]	600,000 [3]	600,000	600,000	600,000
MINERAL FUELS AND RELATED MATERIALS						
Coal, lignite		3,003,000	3,126,000	3,282,000	2,400,000	2,300,000
Natural gas, dry	million cubic meters	59,692	62,750	65,186	67,593	65,000
Petroleum, crude		3,451,000	3,007,000	3,017,000	2,533,000	2,331,000 [3]
Petroleum refinery products		7,133,000	7,323,000	NA	NA	NA
Uranium:						
U content		2,300	2,270	2,320	2,338	2,400
U_3O_8 content		2,712	2,677	2,736	2,757	2,800

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. do. Ditto. NA Not available.

[1]Table includes data available through August 15, 2010.

[2]Uzbekistan also is believed to produce such mineral commodities as selenium and tellurium, but information was not adequate to estimate production.

[3]Reported figure.

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TABLE 2

UZBEKISTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

(Metric tons unless otherwise specified)

Commodity		Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity[e]
Bismuth		Ustarassay deposit (depleted)	Chotqol and Kuraminskiy Khrebet regions	NA
Cesium, lithium, rubidium		Shava-Say deposit	NA	NA
Clays:				
Bentonite		Arab-Dasht and Khaudag deposits	NA	NA
Kaolin		Angren deposit	Angren region	8,000,000
Coal:				
Lignite		OJSC Uzbekcoal and OJSC Apartak	Angren deposit, Toshkent region	6,000,000
Bituminous		JSC Shargunugol	Baysunskoye and Shargunskoye deposits, Surxondaryo Viloyati	1,000,000 [2]
Copper:				
Mine output, Cu content		Almalyk mining and metallurgical complex	Dalneye, Kalmakyr, and Sary-Cheku deposits	100,000 [2]
Metal		Almalyk refinery	Olmaliq	130,000
Diamond		Karashok and Kok-Say deposits	Navoiy Viloyati	NA
Feldspar		Karichasayskoye and other deposits	Deposits in Samarqand and Toshkent Viloyati; Qoraqalpog'iston Respublikasi	120,000 [2]
Fertilizers		Ammophos production association	Olmaliq	NA
Do.		Azot production association	Fergana area	NA
Do.		Elektrokhimprom production association	Chirchiq	NA
Do.		Kokand superphosphate plant	Qo'qon	NA
Do.		Naviazot production association	Navoiy Viloyati	NA
Do.		Samarkand chemicals plant	Samarqand Viloyati	NA
Fluorspar		Agata-Chibargata, Aurakhmat, Kengutan, Kyzylbaur, Naugarzan, and Nugisken deposits	East of Toshkent Viloyati	150,000
Do.		Syrpatash deposit	Namangan Viloyati	NA
Gold	kilograms	Adzhi-Bugutty, Amantaytau, Balpantau, Bulutkan, Donguz-Tau, Muruntau, and Taurbay deposits	Central Qizilqum region	85,000 [2]
Do.		Navoi mining and metallurgical complex (Uzbekistan State Committee for Geology and Mineral Resources)	Muruntau deposit	65
Do.		Kochbulak and Kyzyl-Al'ma-Say deposits	Toshkent Viloyati	NA
Do.		Almalyk mining and metallurgical complex	Dalneye, Kalmakyr, and Sary-Cheku deposits	NA
Graphite		Tadzhi-Kazgan deposit	Navoiy Viloyati	NA
Iron ore		Syurenata deposit	Toshkent Viloyati	NA
Lead, mine output, Pb content		Almalyk mining and metallurgical complex; Altyn-Topkan and Uchkulach deposits	Uchkulach deposit in Toshkent Viloyati [Altyn-Topkan deposit is located in Tajikistan (in 1999, Altyn-Topkan was transferred to the control of Tajikistan)]	40,000 [2]
Manganese		Dautashskoye deposit	Qashqadaryo Viloyati	40,000
Molybdenum:				
Mine output, Mo content		Almalyk mining and metallurgical complex; Kalmakyr and Sary-Cheku deposits	Toshkent Viloyati	900 [2]
Metal		Uzbek refinery and hard metals plant	Chirchiq	NA
Natural gas	million cubic meters	Gazli, Kandym, Khauzak, Kokdumalak, Pamuk, and Shurtan-Say deposits (major)	Qashqadaryo Viloyati in the Amu Darya Basin	70,000 [2]
Do.		Itera Group Ltd., 45%; OAO Lukoil, 45%; Uzbekneftegaz JSC, 10%	Buxoro and Gissarak regions	NA
Natural gas condensate		Trinity Energy PLC	Ustyurt Platosi region	NA
Natural gas liquids	million cubic meters	Mubarek gas processing plant	Muborak region	28,000
Do.		Shurtan gas-chemical complex	Shurtan-Say deposit in Qashqadaryo Viloyati	137,000

See footnotes at end of table.

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TABLE 2—Continued

UZBEKISTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2009[1]

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity[e]
Petroleum:			
Crude	Kokdumalak deposit	Qashqadaryo Viloyati in the Amu Darya Basin	9,000,000 [2]
Do.	Mingbulak deposit	Fergana basin	NA [2]
Refinery products	Fergana oil refinery	Fergana area	8,800,000
Do.	Bukhara oil refinery	Buxoro area	2,500,000
Phosphate	Kyzylkum phosphorite complex	Djeroy-Sardaryinsky deposit	NA
Potash	Tyubegatan deposit	Southern Uzbekistan	NA
Rhenium	Almalyk mining and metallurgical complex	Toshkent Viloyati	NA
Selenium	do.	do.	NA
Silver	do.	do.	NA
Do.	Kosmanachi, Okzhetpes, and Vysokovoltnoye deposits	Namangan Viloyati	NA
Steel, crude	Bekabad steel mill	Bekobod area	1,100,000
Sulfur	Almalyk mining and metallurgical complex	Dalneye, Kalmakyr, and Sary-Cheku deposits	NA
Do.	Mubarek gas processing plant complex	Muborak area	2,000,000
Tellurium	Almalyk mining and metallurgical complex	Toshkent Viloyati	NA
Tungsten:	Deposits:	Locations:	1,200 [2]
Mine output, W content	Koytash deposit	Northeastern Uzbekistan	
	Ingichka and Lyangar deposits	Zirabulak Mountains	
	Ugat deposit	Northern Uzbekistan	
Mine output, WO_3 content (0.49%)	Sautbay wolframite deposit	Qizilqum region	NA
Metal	Uzbek refractory and hard metals plant	Chirchiq	NA
Uranium, U content	Navoi mining and metallurgical complex	Central Qizilqum region	3,000
Vermiculite cubic meters	Tebin-Bulak deposit	NA	25,000
Zinc:			
Mine output, Zn content	Almalyk mining and metallurgical complex	Khandiza and Uchkulach deposits	NA
Metal	do.	do.	80,000

[e]Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

[1]Many location names have changed since the breakup of the Soviet Union. Many enterprises, however, are still named or commonly referred to based on the former location name, which accounts for discrepancies in the names of enterprises and that of locations.

[2]Capacity estimate is the total for all enterprises that produce this mineral commodity.

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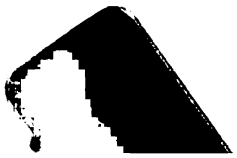

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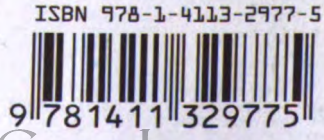

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